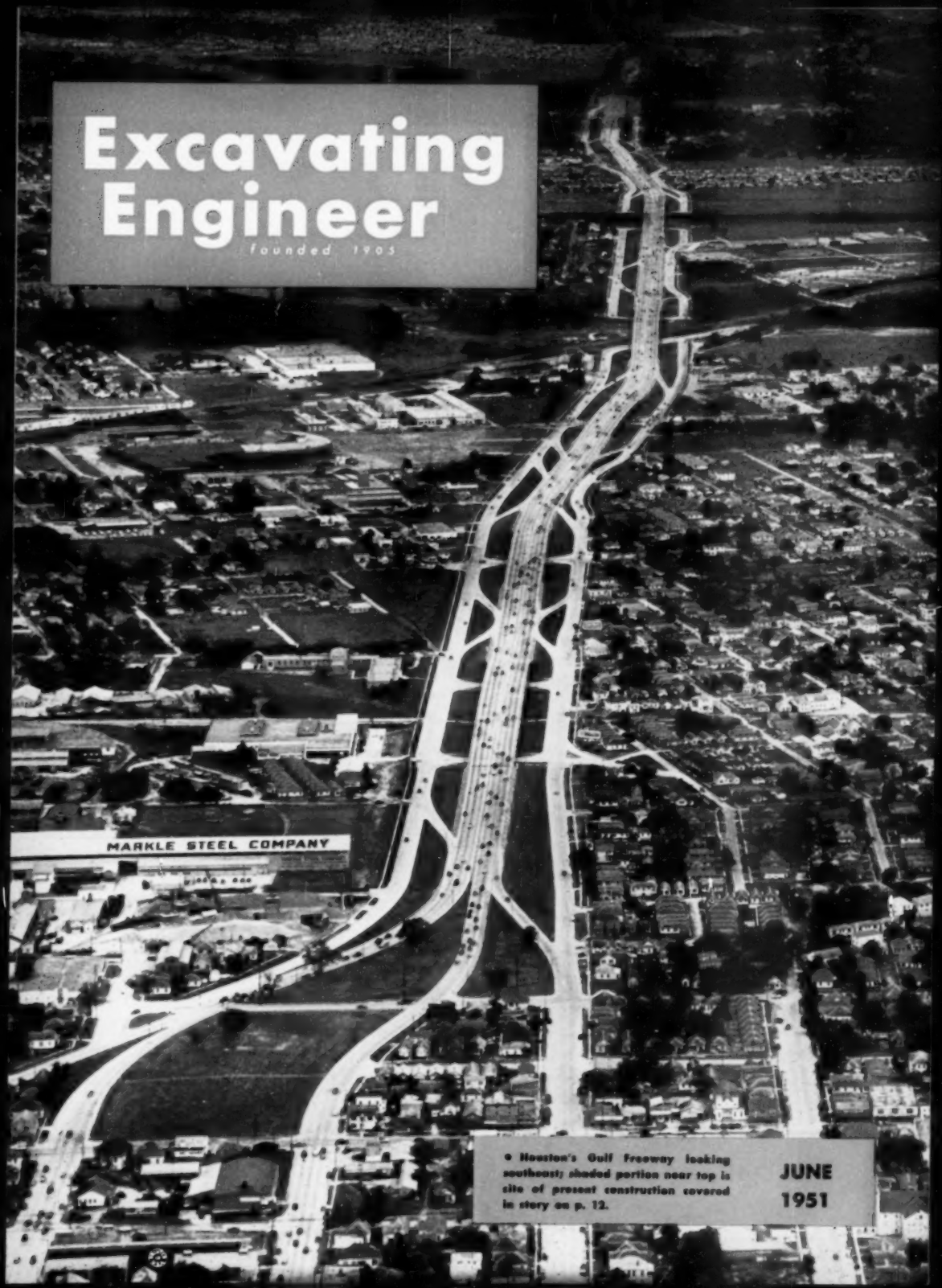
Excavating Engineer

founded 1905



• Houston's Gulf Freeway looking southeast; shaded portion near top is site of present construction covered in story on p. 12.

JUNE
1951

"Hydrocrane Great for Close-Quarter Digging"

Says Wisconsin Contractor

"With my H-2 Hydrocrane I can handle jobs other fellows can't begin to do," says Bill Johnvin, Mountain, Wis., contractor. "It's great for close-quarter digging, especially under overhanging branches. And I run into a lot of this while excavating basements and putting in septic tanks for folks building homes out in the woods."

Working in a heavily wooded section, Bill Johnvin's Hydrocrane widens and deepens a section of trout stream to make a pond. The telescopic boom and independent boom hoist combination is a real asset in this close quarter digging.

Johnvin excavates about 50 basements yearly, ranging in size from 24 x 24 to 50 x 50 ft., and handles an equal number of septic tank jobs. He has put in as many as three septic tanks a day. This includes digging tank pit, about 70 ft. of trench, and a hole for the dry well — plus setting the tank. Other jobs include loading logs and pulp wood, digging trout ponds and silo pits, and even digging graves.

This contractor says that his Hydrocrane paid for itself in the first year and a half of service, in addition to giving him a fair living.

Two Hydrocrane sizes— ¼-yd. 2-ton, ⅜-yd. 3-ton. Available with clamshell, crane hook, grapple, magnet, bulk materials bucket and catch basin cleaner. Send coupon for full details.

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HYDROCRANE DIVISION
South Milwaukee, Wisconsin

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Company.....

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City.....State.....

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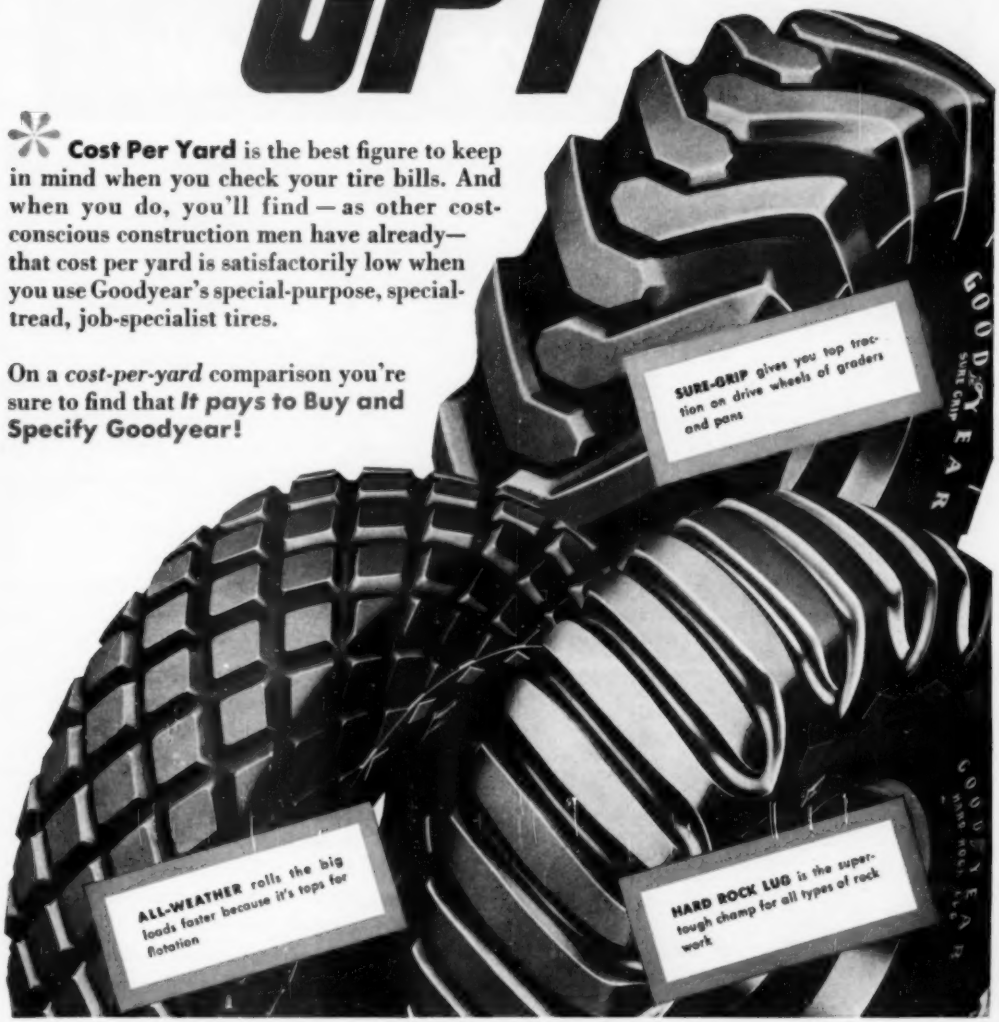
*Cost Per Yard is the best figure to keep in mind when you check your tire bills. And when you do, you'll find — as other cost-conscious construction men have already — that cost per yard is satisfactorily low when you use Goodyear's special-purpose, special-tread, job-specialist tires.

On a *cost-per-yard* comparison you're sure to find that *It pays* to Buy and Specify Goodyear!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ALL-WEATHER rolls the big loads faster because it's tops for flotation
HARD ROCK LUG is the super-tough champ for all types of rock work
GOODYEAR

GOODYEAR

MORE TONS ARE HAULED ON GOODYEAR TIRES THAN ON ANY OTHER KIND

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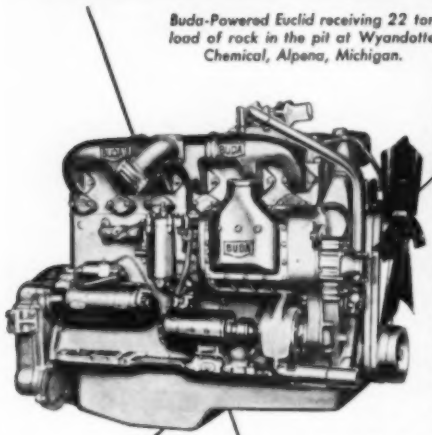
14 BUDA SUPER Diesel-Powered "EUCS" Average 16 hrs. per day for 4 Years* WITHOUT MAJOR OVERHAULS!



Buda-Powered Euclid receiving 22 ton load of rock in the pit at Wyandotte Chemical, Alpena, Michigan.

The Buda 844 Super Diesels powering Wyandotte Chemical Company's 14 Model TD-14 Euclid trucks averaged 17,280 hours of operation over a 4 year period without major overhaul.

Buda Diesels provide high travel speeds for faster round trips.

Dependability like that, coupled with low operating cost . . . minimum maintenance and less downtime make Buda Diesels a good bet for any operator. Buda Diesels are giving mine operators more horsepower hours per dollar . . . more power . . . greater lugging ability and faster round trips under the toughest job conditions. Ask your nearby Buda Distributor for details on Buda dyna-swirl Diesels' outstanding performance on mine hauls like yours. Write for Bulletins and data today.

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Excavating Engineer

founded 1905

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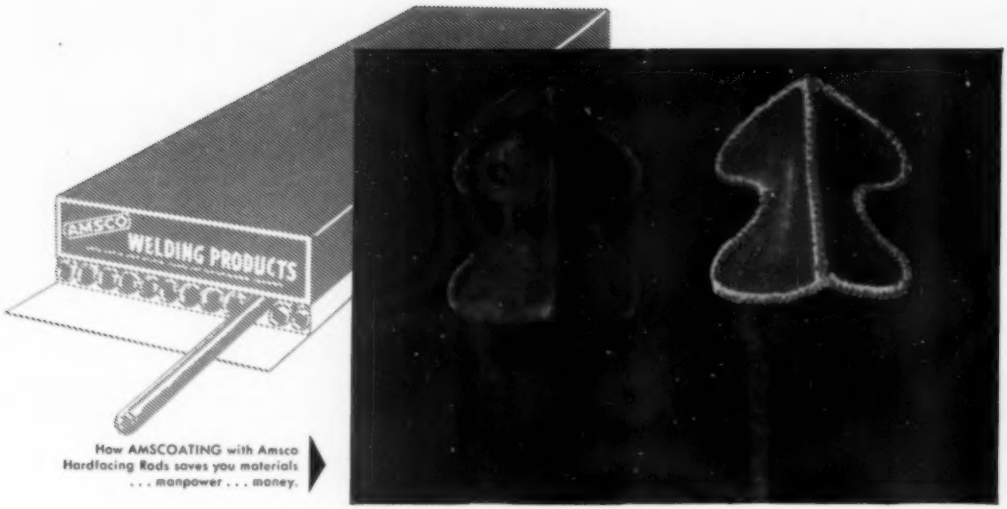

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These bits are used by a Southern quarry for drilling blast holes. A combination of limestone and flint causes extreme abrasion—and a real problem of wear. In an attempt to cut replacement costs, labor and down-time, several makes of hardfacing rods were tried, but without much success.

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Result? AMSCOATING did a job that had never been done before. The drill bits held their edges longer . . . averaged 60 hours of drilling—between regrinds—instead of 30. Maintenance costs and bit changes were cut in half!

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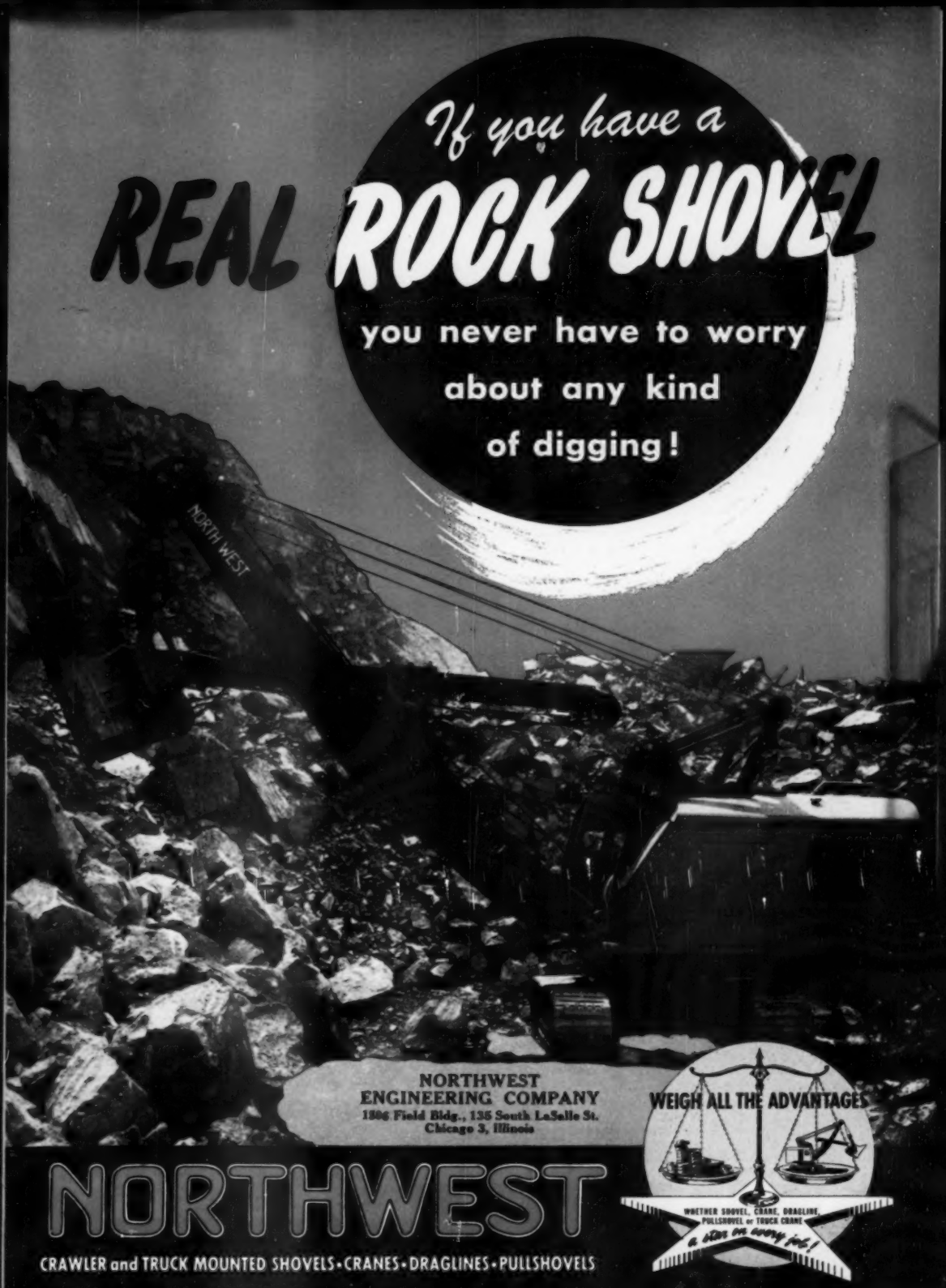
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you never have to worry
about any kind
of digging!
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MORE LOADS PER HOUR
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Simple design and rugged construction of Euclids assure profitable performance year after year on tough jobs. "Eucs" have earned their reputation for job availability — continuous operation, less down time and lower maintenance costs on a wide range of mine, quarry and construction work.

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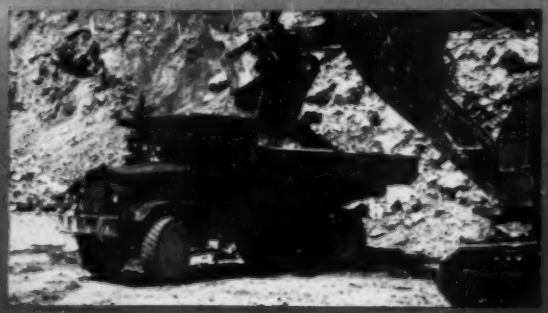
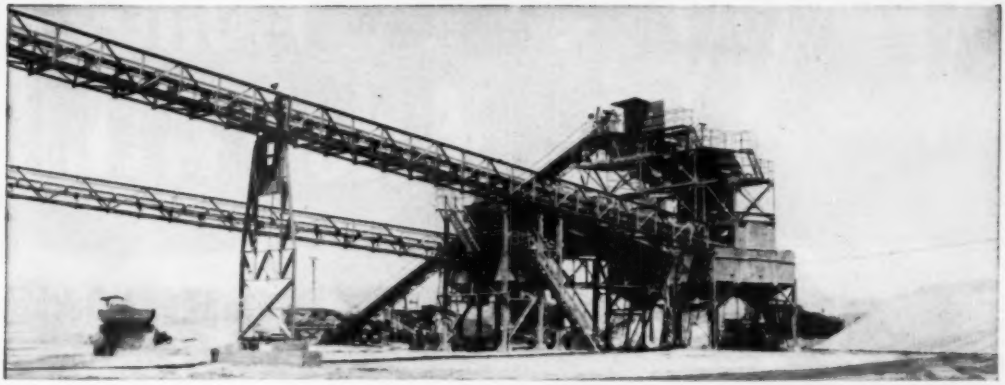
For assistance with your off-the-highway hauling problems and Euclid performance data on work similar to yours, get in touch with your Euclid Distributor . . . or write direct if you prefer.



The EUCLID ROAD MACHINERY Co. CLEVELAND 17, OHIO

CABLE ADDRESS: YUKLID — CODE: BENTLEY

EUCLIDS *Move the Earth*



(A) Gravel is processed, and dirt and silt are screened and removed from sand in this washing and classifying plant. From here, the sand and gravel are carried by conveyors to storage piles. Extensive use is made of electric-powered conveyors to provide economical and reliable transportation. G-E motors and control are used throughout the portable arrangement.

ON JOB AFTER JOB

portable plant makes aggregate

... Electrically

G-E Equipment Powers 245-Tons-per-hour Plant to Process Aggregate Wherever It Is Needed.

This portable aggregate and batch plant has now been operated by the Western Contracting Corp. on four projects. Shown here set up near Newman, Calif., to supply aggregate for the Delta-Mendota irrigation canal, the plant has recently been moved to Yuma, Ariz., to do a similar job for the Welton-Mohawk canal. In 1946 the plant was moved 20 miles to the Newman site, set up, and put in operation in 10 days.

General Electric co-ordinated motors and control are used throughout. They give plant operators accurate control of the process, and have cut outages to a minimum. Motors range from 7½-hp G-E Pacific gear-motors driving conveyor belts to a 150-hp rock crusher motor. A 75-hp vertical motor drives a deepwell pump to supply the plant with water.

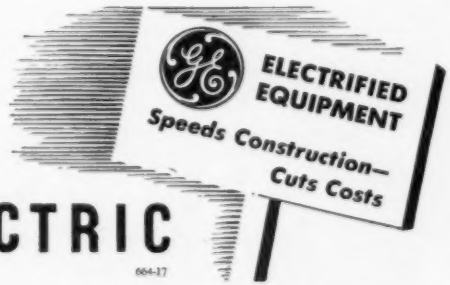
Electrified construction equipment can pay off for you, too. With co-ordinated use of G-E motors and control and G-E power distribution systems you will get safer, more flexible, and more efficient operation. *General Electric Company, Schenectady 5, N. Y.*

(B) Oversize rocks are removed by this scalping screen at the beginning of the conveyor system. A G-E 20-hp motor operates the screen. Maximum flow of material to the screen comes from an apron feeder operated by a G-E variable speed motor remotely controlled with a rheostat by the operator at the top of the washing plant.

(C) Gravel is drawn from the storage pile by a conveyor powered by a 10-hp G-E Pacific adjustable-speed gear-motor. This drive permits low adjustable speeds, easily changed by a pilot motor which is controlled from the top of the washing plant.

Ask him Today!

Whether you buy or build construction equipment, your G-E representative can show you how to do a better job—at lower cost—by complete electrification. Write him now, and he'll call on you at your convenience.



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664-17

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1-Yd. HD-5G
Drawbar hp.: 40.26
Dumping height*: 9 ft. ¼ in.
Total Weight: 16,200 lb.

Standard Buckets up to 4 cu. yd.
(light materials buckets up to 7 cu. yd.)

2-Yd. HD-9G
Drawbar hp.: 70
Dumping Height*: 11 ft. 4½ in.
Total Weight: 29,800 lb.

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The new Allis-Chalmers tractors are not just refinements of existing models . . . *they are new from the ground up* . . . without compromise anywhere in design or materials. Back of their design are your own ideas and those of your operators and mechanics. These are combined with the vast experience of Allis-Chalmers to set new standards of Performance, Durability, Simplified Servicing, Ease of Operation.

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Rock Forks
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Plus other attachments for some models

Introducing a New Era of Tractor Usefulness

These new Tractomotive shovels on the larger size Allis-Chalmers tractors now bring you the same wide utility, the same outstanding performing ability as the popular HD-5G — the Tracto-Shovel that revolutionized excavating and material handling.

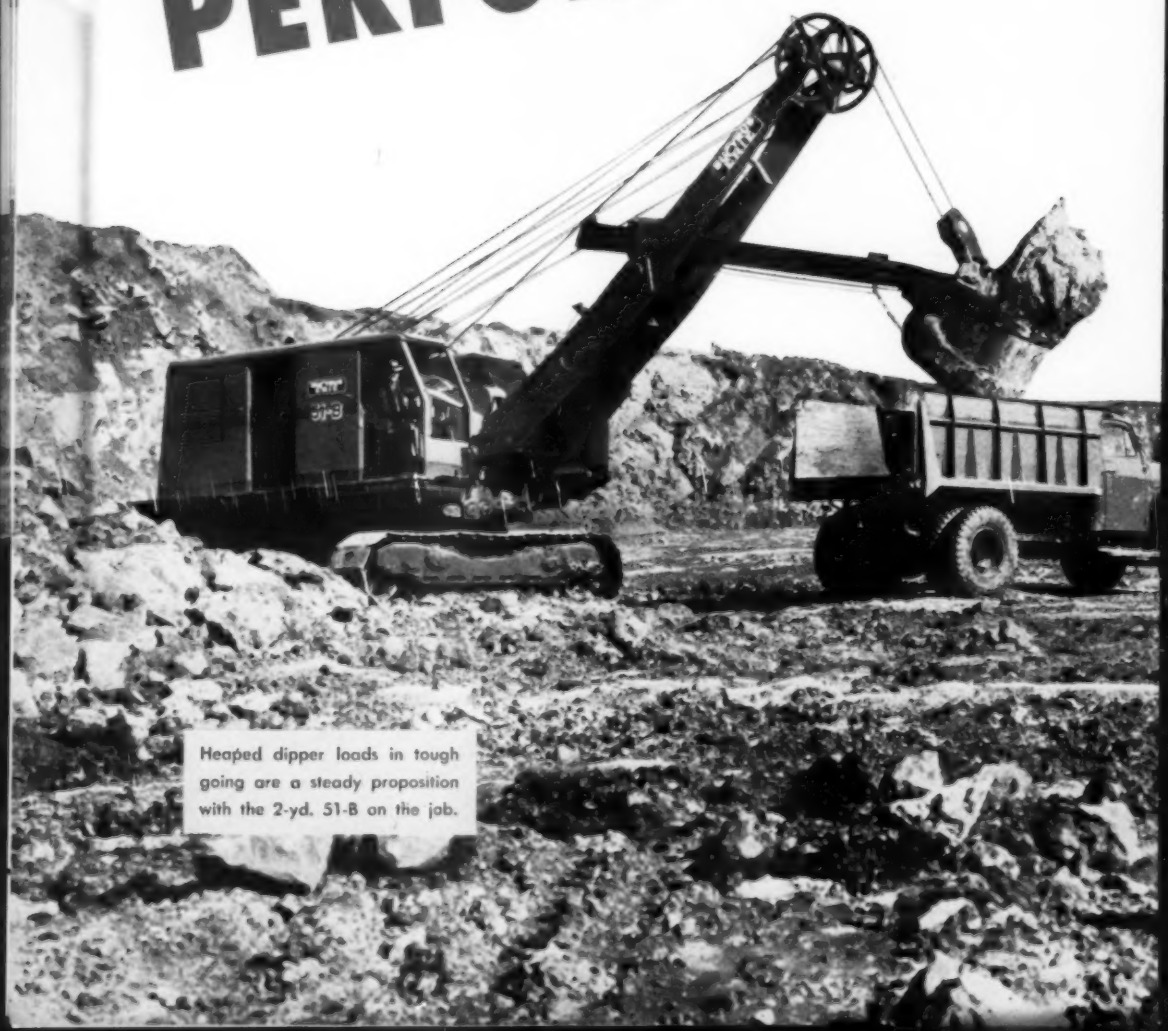
3-Yd. HD-15G
Drawbar hp.: 102
Dumping Height*: 12 ft. 8 in.
Total Weight: 40,000 lb.

4-Yd. HD-20G
Hydraulic Torque Converter Drive — 175 net engine hp.
Dumping Height*: 13 ft. 5 in.
Total Weight: 61,600 lb.

*Height of bucket hinge

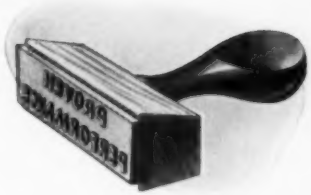
---Mark

PROVEN PERFORMANCE



Heaped dipper loads in tough going are a steady proposition with the 2-yd. 51-B on the job.

# of a Preferred Excavator



THE four most important measures of excavator performance are a smooth fast work cycle, ability to stand up under punishment, quick front end convertibility, and ease of maintenance. Bucyrus-Erie fills the bill on all four.

Bucyrus-Erie's outstanding design balance ties in the dig-swing-dump operations smoothly and efficiently. Highly responsive controls, smooth clutch action and positive, independent crowd help operators get bigger loads every pass . . . more passes every hour than ever before.

There are seven different Bucyrus-Erie models in the ⅜- to 4-yd. range of gasoline, diesel, and single-motor electric machines — each with size and strength throughout to match its rated capacity. Each can be quickly converted in the field to the front end that produces the best job efficiency. And simple, clean design makes parts readily accessible, maintenance easy.

Best proof that these features bring top performance is out in the field. For instance, yardage-wise owners have bought more 10-B's than any other ⅜-yd. excavator . . . more Bucyrus-Eries for rock than any other make. The record shows that with owners, operators and maintenance men alike, Bucyrus-Erie is the one line that's

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SOUTH MILWAUKEE, WISCONSIN

Excavating Engineer
JUNE, 1951 • founded 1905

Houston Gives Gulf

by Edward F. London

Fills wrapped in asphalt membrane and cast-in-place under-reamed foundations feature present construction on Houston's expressway system. Now under way are $5 million in prime contracts held by local firms—Farnsworth-Chambers Co., Inc. and Gulf Bitulithic Co.

TWO Houston firms are hard at it, forging new links in that progressive city's expanding expressway chain. Farnsworth-Chambers Co., Inc. is handling three contracts totalling 2¼ millions for 2.67 miles of the Texas Gulf Freeway—Houston to Galveston. Construction of a prominent offshoot, the LaPorte Expressway is making good progress under a $2½ million prime contract held by Gulf Bitulithic.

About six miles of the Gulf Freeway have been completed since the project was started in 1946. By agreement between the Texas State Highway Commission and the City of Houston, a North-South and East-West Expressway system of about 30 miles will be constructed. The estimated total cost runs to $50 million. The Freeway section now building will merge with State Highway 75 to Galveston.

Under the direct supervision of W. J. VanLondon one of the four Engineer-Managers, installed by the Texas Highway Department in four major cities, the Houston-Galveston Gulf Freeway incorporates four significant trends in expressway design and construction.

FIRST: A new and different system of loading and unloading traffic between feeder streets and the expressway.

SECOND: Embankments are built to heavier densities than engineers formerly considered necessary.

THIRD: Completely surrounding all earth fill with asphalt seal coat (top, bottom and sides) in order to make densities permanent, by keeping out infiltrating water and keeping in the optimum moisture of compaction.

FOURTH: The elimination of pile driven bridge footings, by constructing reinforced concrete columns poured-in-place with under-reamed spread footings on all bridge structures.

All design and construction costs are paid from state and federal funds. The locations were made in cooperation with the City of Houston which spent $7 million for rights-of-way and destroyed 208 buildings to make way for the road.

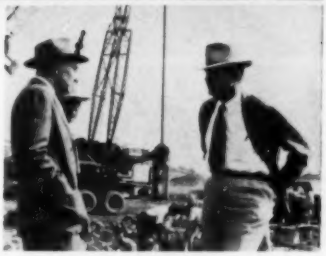
First Section Proves Popular

Starting in 1946, the first 3½ miles of the Gulf Freeway was placed in operation October 1, 1948, and on the first day the traffic count for this section was 28,800 vehicles, which number has increased to 65,000 vehicles per day at present. The estimated capacity of the expressway, utilizing frontage roads and Freeway lanes is 100,000 vehicles per day.

• Above: Embankment approaches partly completed. Traffic at far left has been routed around western side of project.

• Left: From right, Ed Strickler, Farnsworth-Chambers superintendent; George Strickler, superintendent of underground construction and Jack Watson, under-ream shaft driller.

• Right: W. J. VanLondon, Freeway Manager, consults with Frank Geron and Joe Delk, highway department engineers.



Freeway a Flying Start

The superficial design of the Freeway consists of six 12-ft. lanes; three in each direction divided by a 4-ft. median strip, six inches high; with a 10-ft. emergency parking lane on each side except over the bridges.

On either side of the Freeway lanes are 32-ft. frontage or service roads, two 12-ft. access lanes; one 8-ft. parking lane (whenever required to serve adjacent property) and street and railway grade separations with traffic interchange connections.

Cross streets average about one-half mile apart. All traffic interchanges are of the diamond pattern, which permits traffic to move on a direct diagonal course to and from the Freeway, without the reverse rotary movement required by the conventional clover-leaf design. Although the posted speed is 45 mph, the safe speed is much higher—depending on the driver and traffic conditions.

A unique feature of the new Freeway is the traffic collection and distribution system near the central business district. Traffic is loaded and unloaded through a 4-street system 1¼ miles long, which merges with the Gulf Freeway to the southeast and will later merge with the north expressway (proposed) to Dallas.

This 4-street system intersects 18 north-south streets which draw and disperse almost all of the large volume of traffic from the central business area as well as the southern and southwestern sections of this lusty city.

Although the average completed cost under contract is $1,600,000 per mile, this cost is not considered excessive by Engineer-Manager VanLondon, who explains it in terms of cost per vehicle mile of service rendered. VanLondon figures it as approximately equivalent to a farm-to-market road costing $7,500 per mile and carrying 300 vehicles per day. One day's operation on one mile can be figured thus

$$\text{Freeway: } \frac{\$1{,}600{,}000}{65{,}000} = \$24.60$$

$$\text{Farm-Market Road: } \frac{\$7{,}500}{300} = \$25.00$$

All designs provide for handling the present maximum legal truck loading with a safety factor of between 2 and 3. The simplicity of design, combined with an avoidance of unnecessary features, and including maximum strength and good appearance, make this expressway outstanding.

Finish Four Contracts

The first contract awarded Brown & Root, Inc., Houston, was started in October 1947; totaled $1,052,400 and called for 1.1 miles of grading, storm sewers, pavement and signal systems on four parallel streets that act as feeder streets to the Freeway.

Contract number two, totaled $1,328,000 for 2.2 miles of storm sewers, constructed by R. P. Farnsworth Co. (now Farnsworth-Chambers Co., Inc.)

Contract number three awarded to Brown & Root, totaled $2,262,400 for grading, flexible base, paving, construction of two overpasses and lighting.

Contract number four also awarded Brown & Root, called for .65 miles of complete roadway and two overpasses—excepting the sewers. This totaled $1,242,000.

These contracts have been completed,

●Moving muck to embankments a quarter of a mile to the right, these 8-yd. LeTourneau scrapers get an assist from a D8 in loading the heavy material.

● Above: Tampo sheepsfoot rollers compacting west embankment near La Porte interchange of Gulf Freeway. Grader and compactors in background are working on east embankment.

● Below: With one man in the hole, the drilling and under-reaming crew prepares belled bottom for bridge foundation footings. Steel casing is lowered by vertical rig at right.

and now, Farnsworth-Chambers Co., Inc., has a 150-man crew under Superintendent Ed Strickler, engaged in a $2,850,000 contract covering the construction of a 2½-mile section of the Gulf Freeway from Griggs Road to Sims Bayou.

Including four bridge structures, a master interchange, Freeway and service roads, this job calls for a total excavation of 300,000 yards of clay and common material; placing 75,000 yards of concrete; 250,000 yards of flexible base; 1,500,000 pounds of structural steel; 1 million pounds of reinforcing steel; and 56,000 square yards of black sod.

As approximately the same specifications and methods were used by these contractors on the Freeway so far, only the present contract will be described.

Strip and Save Topsoil

After clearing approximately eight acres with Caterpillar D7 bulldozers, four inches of topsoil was removed from the right-of-way by 8-yd. Tournapull scrapers and Caterpillar DW10's with scrapers, which stock-piled the topsoil at convenient locations along the right-of-way. This topsoil is replaced on the sides of the embankments and between the service roads by the same equipment, when the construction work is completed.

While the stripping was in progress, a 224 Buckeye ditcher was excavating the large sewer mains to a depth of 12 feet; and a 120 Buckeye ditcher was digging the laterals six to eight feet

deep. The cost of this underground construction under one of the contracts to Farnsworth-Chambers totals $1 million.

The large mains are monolithic reinforced cast-in-place concrete. The laterals are constructed by laying precast pipe, varying from 18 inches to 30 inches in diameter.

As the pipe is laid in the laterals, shell concrete is poured to a depth of four inches above the pipe and allowed to set before backfilling. Most of the backfilling on the sewer construction is done by hand labor tamping with air tools powered by a 315 cfm Ingersoll-Rand, diesel compressor. George Strickler, in charge of underground construction, says at least 90% of this backfill operation is hand work.

Require No Borrow

While the Buckeye ditchers were trenching sewer lines, Tournapull scrapers, Caterpillar model 12 Maintainers, and Caterpillar D7's and D8's were excavating roadways to subgrade averaging from six to twelve inches for the roadways, and six feet below ground level at the overpass sites. All excavated material is being used to build the embankments for the bridge approaches. As a nice balance between excavation and fill is maintained on the job, no borrow is required.

With the grade to bridge structures about 3% and the slopes 3/1, the embankments are being built in 1-ft. lifts. Tournapull 8-yd. scrapers do the hauling, distance of which averages about a quarter of a mile. When the weather is dry, there is no trouble; but wet weather has turned this poor grade soil into hard-to-handle clay muck, which also makes it difficult to compact fill to the 100% Proctor density specified on all roadways and embankments.

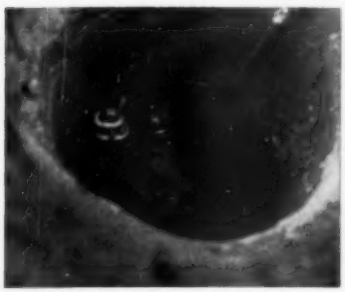
The embankments and roadways are being compacted to 100% Proctor density by three sets of BMCO triple drum

• Above: Texas Highway Department soil engineers test to determine depth of hole for bridge footing. Under-reaming tool in foreground has out-flared wings which expand as tool reaches bottom of shaft.

• Right: Averaging one fpm, contractor-built, 30-in. power soil auger is capable of going to a depth of 40 feet. Steel collar keeps auger in line.

• Bottom left: Occasional hand drilling is necessary in belling the shaft. Material is placed in a canvas bag and hoisted out by dragline.

• Below: Watson Ft. Worth House Moving Co. under-reams foundation hole for overpass bridge while Northwest 25 dragline swings ¾-yd. concrete bucket from paver to shaft.



• Stock-pile of top soil from Freeway starts return trip as Northwest 25 loads Ford 6-yd. dump.

• Self-propelled Ottawa Hydra Hammer is used in backfill tamping demonstration for Gulf Bitulithic.

• Contractor-built rig laying sewer pipe for Gulf Bitulithic on La Porte section of Freeway.

sheepsfoot rollers five feet in diameter, 750 psi; and two sets of Tampo 4-drum rollers, drawn by Caterpillar D8 crawlers.

After compaction, a seal coat consisting of O.A. 55 asphalt is applied over sub-soil base on all ground level roads and the base of the embankments, at the rate of one gallon of asphalt per square yard, by two contractor-built asphalt distributors, mounted on Ford F-7's. This seal coat is also applied on the embankment sides and roadways after compaction.

Wrap Fills in Asphalt

And here is where interesting and profitable use has been made of soils engineering as applied to protection of earth fills and compacted base courses. For the first time on a large scale, all earth fill on service roads, roadway embankments and bridge approaches were completely wrapped up —bottoms, tops and sides—with an asphalt membrane.

This membrane treatment wraps up the finished product in such a way as to prevent moisture fluctuations, which quickly reduce the strength of compacted materials.

Mr. F. A. Harris, Soils Engineer for the Highway Dept. is well satisfied with the way this asphalt membrane is continuing its function in spite of the heavy service to which completed sections of the Gulf Freeway are subjected. After four years, testing shows the membranes intact, and the asphalt still very much alive.

Pour Into Under-Reamed Shafts

While the overpass approaches and embankments were being worked, holes for new type cast-in-place foundations for the bridges were being drilled by the Watson Ft. Worth House Moving Co., under a sub-contract from Farnsworth-Chambers, at a price of $7.50 per lineal foot for 30-in. diameter shafts; and $30.00 per cubic yard for belling or under-reaming the bottoms of the shafts.

According to W. J. VanLondon, this type of foundation, commonly termed under-reamed, has resulted in a 50% saving.

Soil Engineer Harris and his assistants work with the drilling contractor in close coordination. As use of this type of foundation requires a thorough soil exploration to determine the feasibility in each case, and the depth of the shaft; Harris and his crew obtain

• Above: Workmen sift pea gravel on freshly laid OA 175 asphalt membrane.

• Right: Unit 337 crane handles bucket pouring concrete slab on overpass bridge structure.

6x12-in. undisturbed samples, with specially designed equipment. These samples are sent to the Highway Department field laboratory close by, for triaxial and other tests.

Since the test holes are the same size as the foundation hole, information is gathered on water bearing and caving formations, by one of the staff who actually enters the hole.

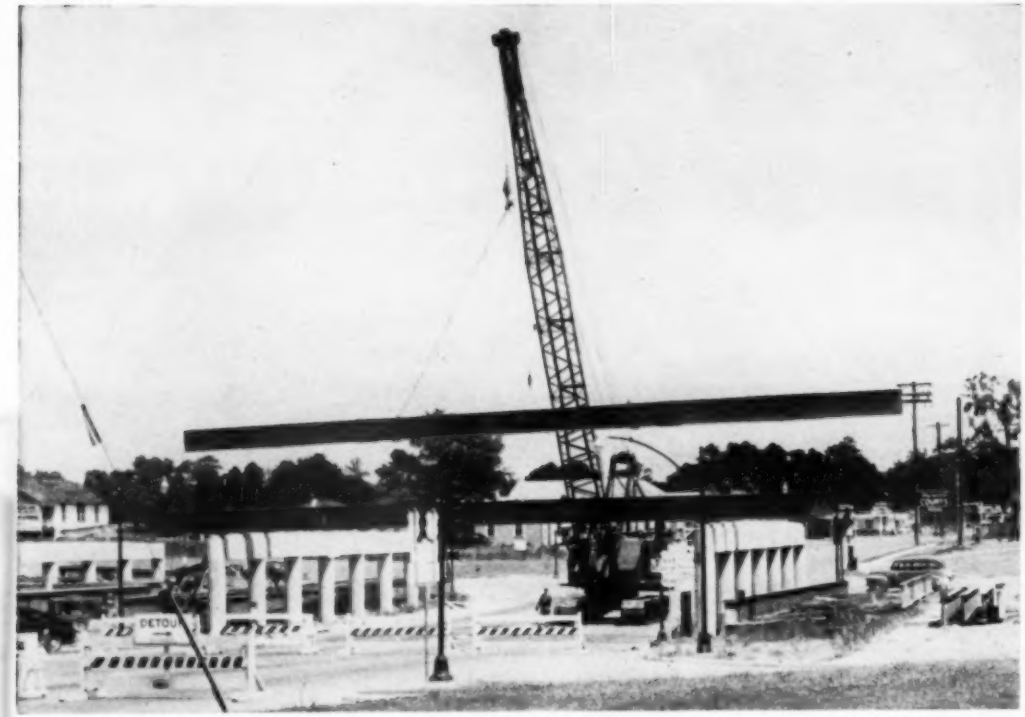
Harris says this information allows contractors to bid this work with less uncertainty, usually resulting in lower bid prices.

The cost of this exploration averages from $5.00 to $7.00 per lineal foot, which is only slightly more expensive than conventional 4 to 6-in. core holes with undisturbed sampling.

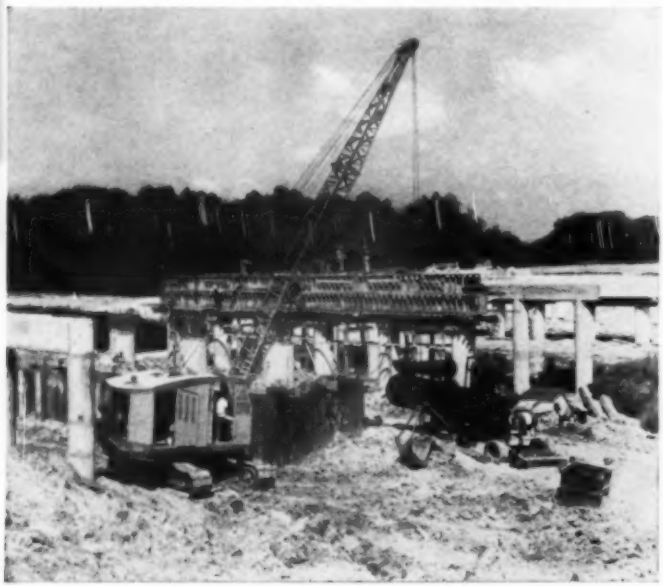
A very good example of saving affected in this manner was furnished by the Griggs Road overpass construction. This is the latest completed structure on the Freeway, 1,115 feet long by 85 feet wide, to accommodate six lanes of traffic, and consists of 24 bents of six columns each.

Information gained from 4-in. core drill holes, a large portion of which were washed borings, indicated construction of steel piling foundations, which would have required the excavation and driving of piling inside cofferdams constructed at each bent; con-

• Muck is rolled on fresh-laid asphalt membrane by Caterpillar D7 as contractor-built distributor puts down another lane.



• Above: A Bucyrus-Erie 54-B places a continuous unit steel beam at Wayside Drive overpass. Freeway cross-streets will average about one every half-mile.



• At overpass crossing unstable area, Koehring 304 places backfill around steel sheet piling driven to control deposit of quicksand.

siderable concrete forming and placement, and earth backfill below ground line.

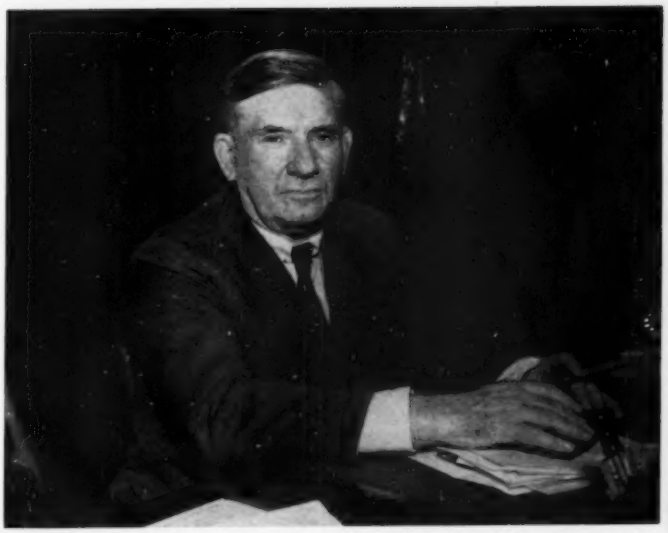
Big Saving on Foundations

The drilled and under-reamed type of foundation was proved feasible in this case by exploration and sampling through 30-in. diameter test holes costing $1,400, and testing and design analysis costing $400. The entire foundation was constructed according to this plan in 17 working days; a fraction of the time that would have been required for piling foundation. The money saved here has been conservatively estimated at $90,000.

Headed by Jack Watson, a six man crew is sinking the under-reamed shafts at the rate of six or seven a 10-hour day. A contractor-built gas engine driven, vertical rotary rig, with a frame high enough to bore to a 40-ft. depth, first drills the hole with a 30-in. power soil auger, averaging one lineal foot per minute.

When the proper depth is reached, the auger is replaced by the contractor-designed under-reaming tool. This is a steel cylinder with out-flared wings; spreading gradually, and cutting the

William F. Carey



William F. Carey, internationally known engineer and industrialist, who was New York's Sanitation Commissioner from 1936 to 1945, died Feb. 23 at his ranch in Indio, Calif. With him when he died were his wife and a son, William F. Carey, Jr. His age was 72.

Mr. Carey was president of the New York engineering firm of Carey, Baxter & Kennedy, Inc., and was an officer and a director of many other industrial concerns. He was extremely popular with contractors and engineers in the United States, Canada and South America.

Commissioner of Sanitation during most of Mayor La Guardia's regime, Mr. Carey transformed the department from a deformed stepchild of municipal government to an efficient agency.

Born in Hoosick Falls, N. Y., on Sept. 14, 1878, Mr. Carey left that village at the age of 16 to become a mule skinner in railroad construction camps in Colorado. His father was a stone mason who kept pigs and the son had the chore of collecting garbage from more refined neighborhoods. That, he often said with a chuckle, was why he probably was selected to "boss garbage in New York."

A forceful man, used to getting things done, Mr. Carey built a logging railroad for the Government in the first World War in one-third the time demanded by other contractors, so that spruce trees sorely needed for barracks lumber could be made quickly available. In the second World War he was a special adviser on construction of Army, Marine and Aviation quarters.

Besides his wife and son, he leaves a brother, Daniel J. Carey of Lakeland, Fla., and three sisters, Mrs. Mary C. Dailey of Bartow, Fla.; Mrs. Oscar E. Pearson of Mahanoy City, Pa., and Mrs. D. S. McGrath of Bronxville, N. Y.

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bell-shaped bottom to the desired diameter as the under-reamer is lowered. The footings are usually belled to a maximum of three times the diameter of the shaft. Earth removal on this operation averages about three yards per hour.

Jack Watson claims that every hole has its own characteristics. Taking an average 35-ft. hole on this job, the strata of soils encountered are composed of the following: Down to 30 feet is heavy clay; to the 25-ft. level is sandy joint clay; to the 15-ft. level very sandy joint clays are found, extremely wet and caving; to 10-ft. level is light blue, dense joint clay extremely caving; and from 10-ft. to zero is a dark red joint clay which will stand unshored for two or three hours.

Pull Casing During Pour

To contain these uncertain soils, for concrete pouring, a steel casing the diameter of the hole is lowered by a specially rigged pole truck, which also removes the casing as the concrete is poured in lifts.

After the holes are drilled, underreamed, and cased, the drill rig moves under its own power to the next hole, and the Farnsworth-Chambers crew takes over to place the reinforcing and concrete.

Air-entrained concrete, furnished by a 34-E, Twin-Batch Koehring dual drum paver, is lifted from mixer to shaft by a Marion or Northwest dragline with a ¾-yd. special concrete bucket. As the concrete is poured, the Watson crew pulls the steel casing from the excavation.

A total of 118 holes is being drilled through the LaPorte Road Crossing and interchange. Included in this Farnsworth-Chambers contract was the relocation of Plum Creek Channel, which formerly meandered back and forth across the Freeway right-of-way. The straightening of this channel eliminated the building of several bridge structures.

Roughing out the new channel was the work of a Bucyrus-Erie, 54-B dragline, powered by Buda diesel, and swinging an oversize 3-yd. Hendrix bucket. This dragline with an 85-ft. boom, and carrying on extra 20,000-lb. counterweight, excavated 75,000 yards of the same type of material found on the Freeway, and 10,000 yards for the placing of new box culverts at each side of the Freeway, and also at the Broadway Crossing of the new LaPorte road.

Dress Banks with H-Beam

As the channel was being excavated by the Bucyrus 54-B, a Marion dragline followed up dressing the banks to a 1½ to 1-ft. slope, by dragging with a 25-ft. H-beam.

So much quicksand was encountered here, Z section sheet steel piling had to be driven at the sides of the 16/1 slope at the bottom of the new channel. The Bucyrus-Erie 54-B operated a McKiernan-Terry 9-B-3 hammer to drive 3,148 fourteen-foot sections. This piling was shipped by boat from Birmingham, England to dockside in the Houston ship channel, and then by rail to the Farnsworth-Chambers material yard at the job site.

After the piling operation, the channel slope between piling and natural ground level received a 2-in. coating

Continued on page 34

Fightin

• Above left: A Bucyrus-Erie 51-B dragline digs a cutoff trench to isolate an anthracite fire near Kulpmont, Pa.

• Parts of fire had moved beneath residences on the edge of Mount Carmel, Pa. In the foreground is fill used to smother the burning region.

• Left: Steam from an underground anthracite fire in Pennsylvania is created as water is coursed down the hillside to cool the material so it can be loaded out. This photograph was taken on property of The Hudson Coal Co., near Carbondale, Pa., where the company is attempting to halt the spread of a fire toward virgin coal. The fire started at a garbage dump and moved into company property.

g Pennsylvania's Old Anthracite Fires

HUNDREDS of thousands of yards of earth and rock are being reshuffled in the anthracite region of Pennsylvania, where contractors for the U. S. Bureau of Mines are engaged in fighting stubborn underground coal-mine fires which have smouldered for many years.

The fire-control work of the bureau, handled by private contractors bidding on the various jobs, involves a variety of techniques developed by federal engineers. In some projects the burning coal beds are smothered under blankets of earth and rock so air cannot reach the burning area. In others, deep trenches are cut around the fire zone to isolate it and prevent its fur-

• A Bucyrus-Erie Bullgrader mounted on an International TD-18 tractor levels fill material after an anthracite fire near Kulpmont, Pa., had been controlled. Joseph Latorre, Ashland, Pa., was contractor on this job.

• Left: Bureau of Mines technologists check the temperature and take gas samples from a borehole leading to a fire area in the Pennsylvania anthracite region. Periodic readings reveal whether or not the fire is being controlled.

• A LeTourneau Carryall scraper, drawn by Caterpillar tractor, travels along a haulage road toward an area at the right where it will gather fill material. Hill in left foreground is fill material used to smother a coal-fire in the Pennsylvania anthracite area. Note steam from part of the fire in left foreground. This scene is near Mount Carmel, Pa., where a Bureau of Mines fire-control contract is being completed by John J. Cullen Mining and Tunnel Contracting Co. of Mount Carmel. *All photos courtesy of U. S. Bureau of Mines.*

• At Carbondale, Pa., employees of contractor Timothy Burke flush incombustible silt from an anthracite breaker (preparation plant) into a borehole to seal mine tunnels and other openings so air cannot reach the burning area far underground. Destruction of underground mine pillars by fire in this area resulted in the subsidence of several homes. Thus far, Burke has flushed 74,000 yards of material underground in the sealing operation.

ther devastating march. Still another system is to drive boreholes down into abandoned mines and fill old tunnels and natural crevasses with incombustible silt to kill the fires by shutting off the air supply.

The accompanying pictures show some of the methods being used by the government in the campaign which is supported by contributing funds or equivalent work to equal one-third the total cost of fighting a fire. The contributing funds come either from the Commonwealth of Pennsylvania or from cities, boroughs and counties.

Typical of the fire-fighting campaign is the job near Kulpmont, Pa., where a fire was moving relentlessly toward a new million-dollar high school. The fire was stopped before it ate into coal beneath the foundations of the building.

In the cities of Mount Carmel and Carbondale, Pa., fires actually had worked beneath residences. Several houses at Carbondale were damaged by subsidence which resulted when fire destroyed old anthracite mine pillars which had been left to support the ground 90 feet above.

At Shamokin, Pa., two cemeteries in the path of an anthracite fire were saved from demolition. The city of Shamokin also would have been threatened if this fire had not been halted.

Tailor-Made Rig Digs Small Canal

A TAILOR-MADE ditcher with wings and horizontal elevators is building 6.5 miles of irrigation laterals on the Columbia Basin Project. Confronted with a job for which no specific machine was available, the Collins Concrete and Steel Pipe Co., Portland, Ore., modified a Buckeye Reel ditcher to do the job in one pass.

The rig is fitted with wings, horizontal elevators, dent divider and aprons hanging from the elevators. It digs a canal with a base width of two feet and a bank height of 2½ feet.

The machine is adjustable for length, width and depth of cut and the progress rate is geared from two feet to eight feet per minute. The ditcher is building the irrigation distribution system of small open canals in Block 40 of the Columbia Basin Irrigation Project.

• This worked-over land has been left in condition for farming after yielding thousands of tons of coal. In the distance, two Bucyrus-Monighans work a new cut.

• Above: Carrington's Coppice, Derbyshire, was a well-known haunt of beauty lovers. When prospectors found traces of near-surface coal, the coppice was opened and productive operation began.

• The gardens of Wentworth Woodhouse, country mansion of the Noble Earl Fitzwilliam covered a rich coal seam. After a financial arrangement was made, excavation proceeded.

BRITAIN has decided to continue mining coal by open-cut methods for at least four years. This decision by the government has been influenced by two main factors:

First—the coal is obtained with labor outside the mining industry, leaving the deep-mined coal to be won by the shrinking amount of labor available. Second—the coal is of good quality and is obtained at a slightly lower overall cost than deep-mined.

There are other minor factors, disregarding Britain's urgent need for coal, and despite opposition by farming and landowning interests the open-cut schemes throughout the country are increasing in scope.

Since the open-cut program started in a small way in 1942, there has been an enormous yield of coal. Nearly 70 million tons have been distributed, and there are still vast known quantities available for excavation.

To date, about 110 sites have been worked out fairly recently and are now being returned to agricultural use or to their original condition as far as possible. In addition, 295 sites have been already restored. About 125 sites are in production and another 190 are in various stages of excavation.

Work on this vast scale, currently

Determined to take out the coal when and where they find it, Britains have extended their program of open-cut mining and land restoration. Shovels, draglines and tractor equipment scar the earth briefly, then restore the site to its original form.

COAL is where you find it

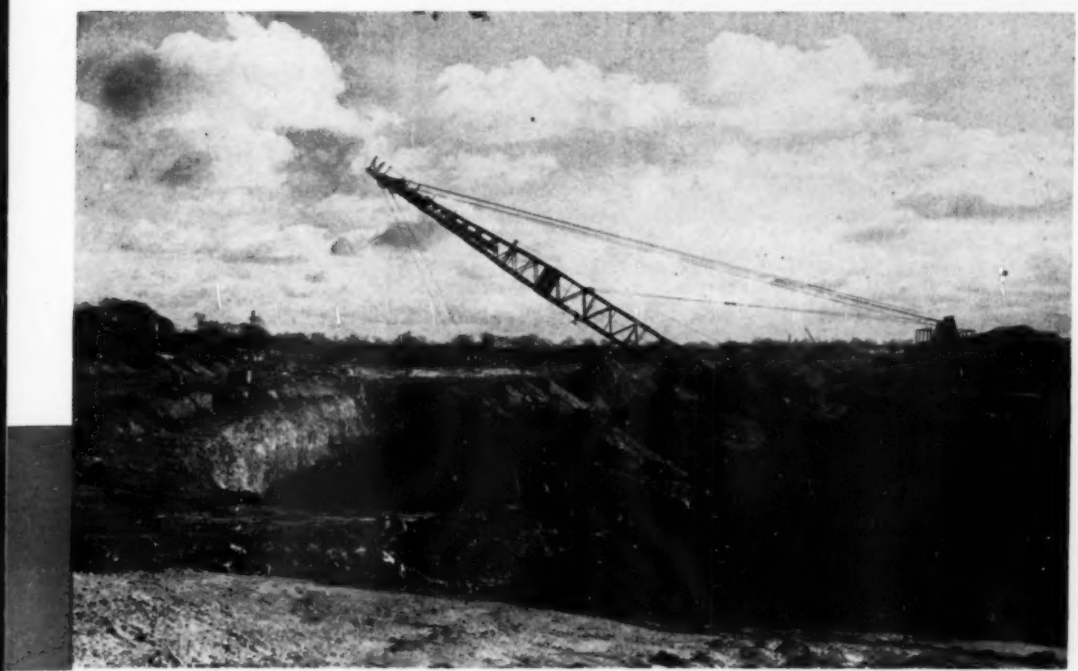
by Edmund Updale

• A Ruston-Bucyrus 1½-yd. shovel loads out high quality coal from the Wentworth Woodhouse estate of Earl Fitzwilliam.

giving more than 12 million tons of coal a year, is being done by 47 contractors using drilling machines for original prospecting, face shovels, walking draglines or crawlers, heavy crawler tractors with scraper or bulldozer attachments, dump trucks for overburden and haulage trucks to handle the coal and subsidiary gear for blasting rock.

A further considerable amount of machinery involves the provision of adequate pumping arrangements on the sites. Cost of production of the coal works out at approximately $4.50 a ton. Another $2.00 per ton goes toward costs of prospecting and wear and tear on excavating, hauling and drilling equipment.

A labor force of 12,000 men is involved throughout the British Isles. The 47 contractors are under contract to the government, as the coal is na-



• An excavation on the River Tyne, near Newcastle is worked by a Bucyrus-Monighan walking dragline. This region is noted for shipping and industry, and much of the coal is consumed in the immediate area.

● Rock is blasted so the shovels can reach the coal beneath. Sites in England presented little difficulty, but in Scotland and Wales solid rock layers had to be removed.

● Caterpillar-drawn scraper helps uncover a coal seam at Derbyshire. In some cases, restored soil was actually improved when better distribution made deeper cultivation possible.

tionalized. In addition, there are many important subcontractors who engage mainly in restoration of the sites after they have been worked.

Increase Production

The scale of open-cut mining will be stepped up for the next 18 months, after which, according to present plans, it will gradually taper off in the next few years. These arrangements are, of course, subject to change according to the production achieved by the deep-mining section of Britain's 210 million tons a year industry.

Of the 50,000 or so acres of land taken over for the open-cut program, 90% was agricultural. The topsoil is invariably segregated when work commences, and part of the subsoil is also preserved in bulk, for replacement.

Farmers get adequate compensation for the exploitation of their land, and agreements exist so that any arrangements they have to undertake to complete restoration is backed—and often carried out—by contract under government guarantee.

Land Restoration Big Job

In Britain where farm land is precious, skilled work has been carried out by contractors in restoring opened land, and when the top soiling is complete, it is given expert attention through the Ministry of Agriculture to ensure the successful growing of crops.

One big advantage of the open-cut coal is that owing to the terms of the contracts under which it is excavated it is comparatively free from dirt, an important factor in calculating the actual value of the yield in terms not of tonnage but of fuel.

Every effort is made to cut down nuisance effect on the sites during operations, and most excavating machinery and other diesel or gasoline-burning engines are fitted with silencers. Blasting operations near houses are controlled, and the times are selected so that firing causes a minimum of disturbance locally. Workings are regularly watered to cut down the amount of dust.

This contribution of the excavating industry to the coal industry's stocks has been the main factor in preventing recurrent fuel crises of the magnitude experienced in 1947, when factories had to close for lack of coal.

Ralph E. Taggert

Ralph E. Taggart, 64, hard-coal industrialist, who almost single-handedly stabilized America's anthracite industry and saved it from bankruptcy in the depression, died April 30 following a heart attack.

Mr. Taggart, president of the Philadelphia & Reading Coal & Iron Co., was official spokesman for the industry in its wage negotiations with John L. Lewis' United Mine Workers. He was a member of the committee which arranged the first contract with the union in 1936. Mr. Lewis, informed of his death, termed him "one of America's greatest industrialists."

Mr. Taggart's chief contribution to the recovery of the anthracite industry was the establishment of a committee which since 1939 has fixed the weekly production quota of hard coal. He is credited with leading the industry into modernization to end unemployment and meet the competition of other fuels.

Mr. Taggart became executive officer of Philadelphia and Reading Coal & Iron in 1935, after being associated with various similar firms. He rescued it from receivership in 1946. The following year, for the first time since it was formed in 1871, it paid common stockholders a dividend, and has continued ever since.

News from the Field

Grafe-Callahan Cons. Co. Relocates in Dallas

Top level changes in the Grafe-Callahan Construction Co. and re-establishment of its headquarters in Dallas, Texas, were recently announced. The firm is the successor to W. E. Callahan Construction Co.

Everett Seabury has been elected president, succeeding Paul Grafe who has been elevated to board chairman. Headquarters have been moved back to Dallas from Los Angeles, Calif. The company has leased a suite of offices in the First National Bank Building.

Organized in 1912 as the W. E. Callahan Construction Co., the firm maintained headquarters in Dallas from 1919 until the death in 1944 of the founder, W. E. Callahan.

At that time, Paul Grafe, who had long been vice president, was chosen to succeed Callahan. Business was handled largely through the Los Angeles office.

The election of Everett Seabury to the presidency and his choice of Dallas as a base of operations brought approval of the directors who, in addition to Grafe include Joe A. Worsham, W. R. Moore and Joseph Irion Worsham.

The company has to its credit a long list of major projects. It built the Madden Dam in the Panama Canal Zone, the Canol Project in Canada and Alaska. It constructed air field and defense projects in Hawaii and the Sandwich Islands in the Pacific Ocean and Bahama Islands in the Atlantic.

In Texas, the company built the jetties at Port Isabel, Lake Waco Dam and pipeline, Bluebonnet Ordnance Plant at McGregor, Garza Dam which created Lake Dallas and the Dallas Power & Light Company's dam at Mountain Creek Lake.

Burec Sets Record

Bureau of Reclamation construction in 17 western states for the fiscal year 1950 reached the highest total in the 48-year history of the Bureau. In the $387 million reclamation program, $277 million in construction work was completed during the fiscal year.

Some 900 new construction and supply contracts were awarded, totaling nearly $140 million. Among the important projects completed during the year were four dams on the Missouri River Basin Project, two dams on the Columbia Basin Project, the Tracy pumping plate structure and large sections of the Delta-Mendota and Friant-Kern Canals of the Central Valley Project, and Grancy Dam, which forms the main reservoir for the Colorado-Big Thompson Project.

The following were outstanding accomplishments:

The Heart Butte, Angostura, Medicine Creek and Enders Dams on the Missouri River Basin Project, two of which were completed well in advance of construction schedules. Heart Butte was turned over to the government by the private contractor 11 months before the deadline, and Medicine Creek almost two years in advance of the scheduled completion date.

Records were set at Bonny Dam, Missouri River Basin Project, in November 1949 for both excavation and earth placing, when 1,280,000 yards were excavated, and 1,100,000 yards of earth embankment were placed. Hungry Horse Dam in Montana, the largest Bureau of Reclamation dam under construction, set a record for concrete placing in June of 123,000 yards.

Although 1950 was the biggest construction year in history, indications are that 1951 will crowd closely the records of the past year's accomplishments, and, in some cases, surpass them. Among the major features expected to be completed during 1951 are nine dams, four power plants, two pumping plants, 2,300 miles of transmission lines, 40 miles of main canals, laterals to serve 14,000 acres and six miles of aqueducts.

Thaw Ore to Ship by Rail

Iron ore was shipped last winter by rail from Minnesota to the Chicago, Youngstown and Pittsburgh districts. The frozen ore presented problems, but tests of car steaming and thawing proved successful, and one company shipped as much as 400 cars of iron ore a day.

The ore shipped by rail in the winter was treated with calcium chloride at the loading point to retard freezing.

Problems pertaining to the mixing of ores for the all-rail movement arose at some of the loading points in the Lake Superior area during the past shipping season. The mixing is usually done at the vessel loading docks. Finally, huge stockpiles were built in layers like a combination sandwich. This method proved satisfactory.

Stocks of Lake Superior ore at furnaces and Lake Erie docks on December 1 were three million tons under the level of a year earlier. According to one authority about 14 million tons of ore were due at furnaces and Lake Erie ports on April 1, 1951.

Safety Award to EE

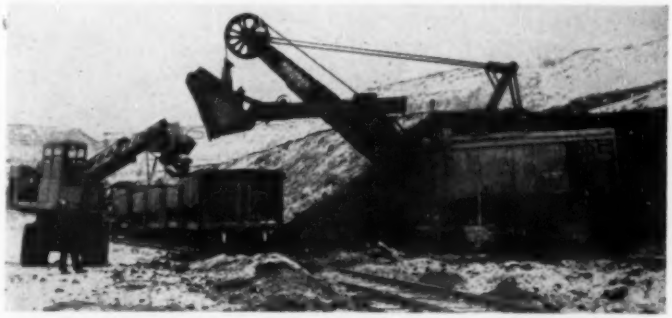
The National Safety Council has announced the recipients of its 1950 Public Interest Awards. The non-competitive award is made annually to public information media for exceptional service to safety.

Among the recipients is EXCAVATING ENGINEER, which received the Public Interest award for 1950. From April through December, EE presented a monthly safety article concerning different phases of the construction industry.

Hole Succeeds Coppock as AAC President

The executive organization of the American Aggregates Corp., Greenville, Ohio, the world's largest producer of commercial processed sand and gravel, is now headed by William E. Hole.

Mr. Hole was elected president of the company by its directors this week, following an annual meeting of shareholders of the firm. He succeeds Fred D. Coppock, founder of the concern



• In order to ship iron ore in winter from Minnesota directly to midwestern steel mills by rail, while the Great Lakes are frozen, the spreader at the left mixes calcium chloride in the cars while the shovel loads ore.

and its chief executive for the last half-century.

A trail-blazer in the business of mining and processing sand and gravel, Mr. Coppock was honored at a Golden Anniversary dinner given by his fellow workers last December. He will now serve in the capacity of chairman of the board of directors and as a member of the executive committee.

Hyland is Moles President

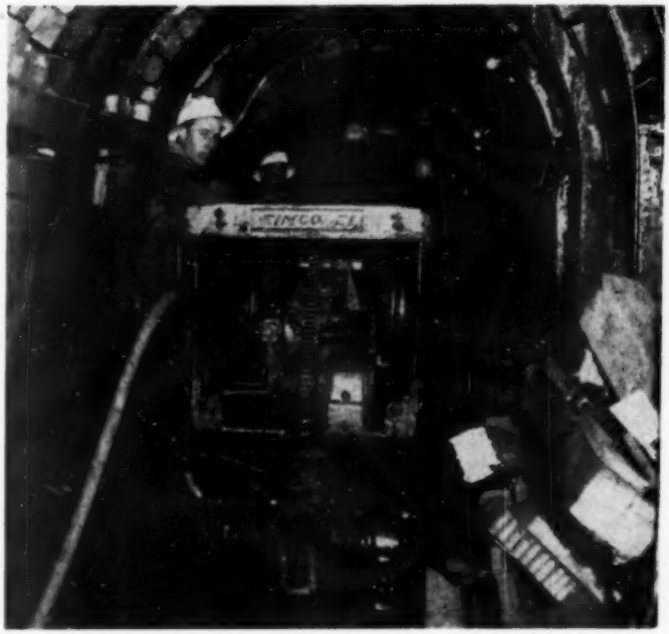
Richard V. Hyland, of Madigan-Hyland, New York consulting engineers, was elected president of The Moles at their annual meeting dinner at the Roosevelt Hotel on May 2. He is a civil engineering graduate of Notre Dame University.

Elected with Hyland were: David Bonner of Frederick Snare Corp., first vice-president; R. E. Dougherty, consultant to Seelye, Stevenson, Value & Knecht, second vice-president; C. E. Simmons, Bethlehem Steel Co., sergeant-at-arms; Geo. P. Walker, Johns-Manville Corp., secretary; H. P. Maxton, Raymond Concrete Pile Co., treasurer.

Trustees, elected for 3-year terms, are: F. J. Driscoll, Geo. F. Driscoll Co.; G. F. Ferris, Raymond Concrete Pile Co.; J. E. Gibbons, American Surety Co. of New York and J. M. Slattery, Slattery Contracting Co.

Probe for Flooded Mines

Utah Construction Co. Crews advancing the Leadville, Colo., drainage tunnel are probing cautiously with 40-ft. drill holes for the abandoned Blonger workings, first of the flooded mines in their path. Now at the 8,500-ft. mark, with only 1,600 feet to go under the current contract, they are instructed to avoid any sudden dangerous inrush of water.



• An Eimco mucker works near the face of the probing tunnel. The steel sets and the close timber lagging are necessary overhead to hold out severely fractured quartzite. Water flow (see base of loader) from tunnel now exceeds 2,000 gpm.

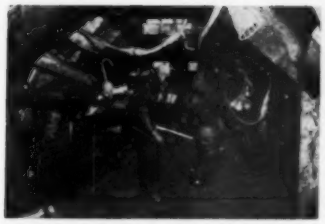
The tunnel recently cut a 2 to 3-ft. thick bed of lead sulfide replacement ore in Cambrian quartzite that assayed 0.01 of an ounce of gold, 4.4 ounces of silver, and 6.1% lead. A sample from a narrow fissure contained 16.6 ounces of silver to the ton. From 1860 to 1944, Lake County mines produced gold, silver, copper, lead, and zinc ores valued at $462,600,000—nearly all of it from the Leadville district.

Mineralization has been encountered at several places within the last 1,000 feet, with the best values showing on the Little Chief, Dives, and Dolphin claims. Although generally too weak for commercial development, this mineralization has indicated that the shales and limestones above the line of the tunnel would be favorable ground for further exploration.

Old and inaccurate mine maps of the Leadville district, which cannot be checked, show the flooded Blonger workings in three different locations just ahead and to the right of the tunnel face. These workings are believed linked with other abandoned mines that also contain large volumes of water. Thus, holes must be drilled fanwise ahead of the tunnel to find the old headings and permit controlled drainage. Preparations are in readiness to bulkhead the tunnel and install a valve to regulate the flow if water is struck.

Although the precautionary drilling has slowed progress, crews pushed ahead 567 feet last month. March 12 through 17 was the best week achieved

• Portal and surface plant of the Leadville drainage tunnel on the east fork of the Arkansas River. The portal is about 1½ miles north of Leadville at an elevation of 9,960 feet.



• Crews driving the Leadville drainage tunnel fight their way toward the flooded mines. These miners are shown placing special timber supports at the working face, nearly 1½ miles from the portal.

under the current contract with an advance of 174 feet. The Leadville tunnel was driven 6,600 feet under an earlier contract before funds were exhausted and work stopped.

Having driven 1,900 feet since the project was renewed, the tunnel crews have passed the halfway point and now have only 1,600 feet between them and their objective, the Robert Emmett shaft, which is linked underground to some of the richest flooded mines in the Leadville district. Barring unexpected difficulties, such as more bad ground or too much water, they are confident of reaching their goal by the end of June.

Tapping the Robert Emmett shaft, 10,100 feet from the portal, should drain most, if not all, of the Fryer Hill basin and perhaps some of the Carbonate Hill basin. This would unwater many long flooded mines and unseal their reserves of lead, zinc, and manganese ores, now acutely needed for defense purposes.

Harry Greshuk is project manager for Utah Construction Co., Salt Lake City and Edward Matson is resident engineer for the Bureau of Mines.

A.G.C. Director Gives 1951 Work Forecast

During 1950 the construction industry established an all-time record of nearly $28 billion in new construction put-in-place, and about $8½ billion in maintenance and repair operations, according to a report by H. E. Foreman, managing director of the Associated General Contractors of America. Only a small portion of this was direct defense construction.

Director Foreman's report given at the A.G.C. 32nd annual convention in Boston, goes on to say until the mobilization program started, the outstanding characteristic of the industry was the intense competition between contractors for the new work coming on the market. This competition assured the public the maximum value for its investment in construction.

Looking at the future, he says, there is uncertainty now about the ultimate

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total volume of construction for 1951. The decisions to be made in the mobilization program and the availability of materials will be the principal limiting factors. With contractors completing work on existing contracts, there appears to be a continuation of the intense competition between contractors for the smaller number of projects now coming on the market.

There is reason to believe that this competition will prevail, so that defense and other essential construction will be constructed with economy.

Other salient points of Mr. Foreman's report follow: The initial emphasis in defense construction has been on rehabilitation and expansion of existing installations, although new installations are being considered. A big upsurge in construction of productive facilities is expected. The majority of defense contracts are being awarded by field offices of the Corps of Engineers and the Bureau of Yards and Docks, where contractors should file their qualifications.

Regarding highway construction, the volume of new construction since 1944 has not been sufficient to fulfill all the needs caused by the deterioration of highways during the war, the cessation of new construction for several years, and increased traffic demands since that time. The principal highways will have heavy usage during the mobilization program.

Authorities in the Bureau of Public Roads and American Association of State Highway Officials have estimated that the nation requires a 10-year highway construction program at a rate not less than the $1½ billion program of 1950 if the nation is not to fall farther behind in replacing essential highways as they deteriorate.

Airport construction under the Federal Airport Act has been limited this year to the projects most essential to national defense, he said. Congress has extended this act for five more years until 1958.

A substantial volume of railroad and other heavy construction is likely this year with emphasis shifting from normal public works to defense construction. Reclamation construction is likely to fall off about 30%, but the volume of flood control and rivers and harbors work should not be cut as much unless Congress takes more drastic action than is expected.

Both the Army Corps of Engineers and the Navy Bureau of Yards and Docks have delegated to division and district officers or district public works officers greater authority to award contracts. Contrary to the policy followed during World War II, most of the contracts are now being awarded by field offices. Information on filing qualifications with field offices has been sent to A.G.C. chapters.

The great importance of civil defense plans and operations is emphasized. Contractors will be expected to furnish much of the equipment and personnel needed in the event of an attack on the United States, and heavy contractors are most likely to be called upon to perform necessary demolition and clearance work.

There is potential market in construction of bomb shelters and other public works projects to be used for protection, but this program is not yet near the construction stage.

Ohio Firm to Pipe Coal

Coal pipelines could place Ohio coal in a competitive market with out-of-state coal and also enable it to compete with oil and gas. James Hyslop, vice-president of Hanna Coal Co., urged the legislative committee to approve a bill which would give such pipelines the right to condemn rights-of-way. That right already is enjoyed by pipelines for petroleum and natural gas.

By mixing coal with water, forming what is called "slurry," research has shown that coal can be transported by pipeline. The Hanna Co. has earmarked $550,000 for construction of a full-size demonstration line to pump slurry 3½ miles through a 12-in. line from its Georgetown mine.

Hyslop said that if the coal is to be transported more than 60 miles it is expected that booster stations will have to be constructed. In cases where it would be desirable to keep shipments from different mines separate, this could be done by using water "spacer," just as is done in petroleum lines now.

He explained that when the slurry reached its destination, it would be returned to coal by settling, filtering and drying. Since large customers such as power plants usually burn pulverized coal, better and cleaner coal would result.

Raise Colorado Oil-Shale Estimate

Recent sampling of the Green River oil-shale formation in northwestern Colorado has increased previous estimates of shale deposits in this area. Partly blocked out and geologically interred shale running 25 gallons a ton or more in the richest area theoretically would yield 125 billion barrels of oil, the actual recovery depending on mining and processing losses. Combined with deposits of 15-gallon-a-ton shale, the theoretical yield in the entire area rises to 494 billion barrels.

The Green River formation in northwestern Colorado covers about 2,590 square miles and the Piceance Creek basin between the Colorado and White Rivers, where all the sampling was done, covers about 1,650 square miles. About 1,000 square miles in the basin is believed to contain shale of possible economic importance.

WASHO Meets June 25

The Western Association of State Highway Officials will hold its thirtieth annual conference in San Francisco, Calif., June 25th to 28th, with headquarters at the Fairmont Hotel.

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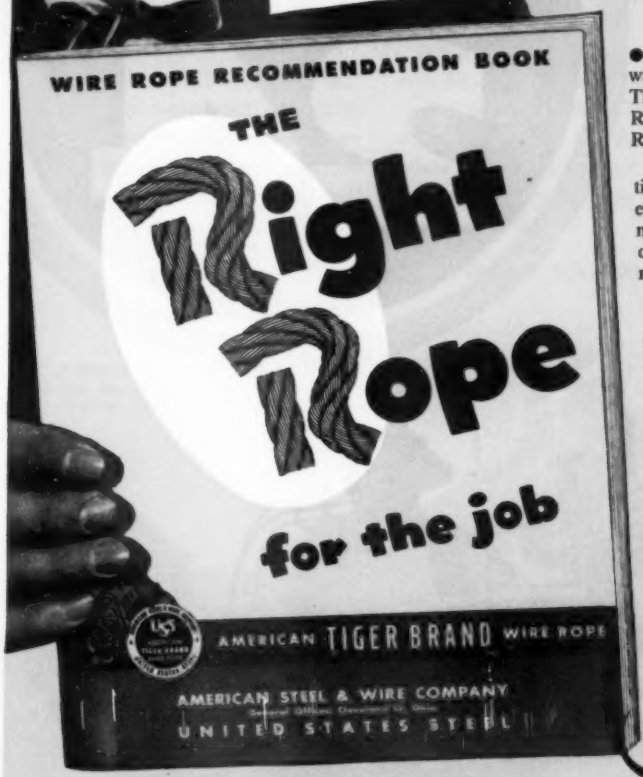

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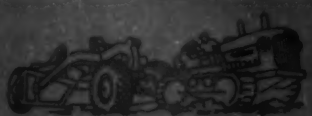
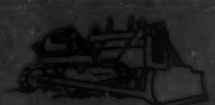
UNITED STATES STEEL

"Big Red" TD 24





How International's "Big Red" Champ outworks the field

When the TD-24 teams up with a loading machine, dirt gets moved from ground to trucks in record time. And the "men who move the earth" are finding this out.

Like the D. W. Winkelman Co., Inc. on a job near Syracuse with a TD-24 loading out 22 pay yards every minute.

"Our TD-24 is the best machine we've ever had," says Superintendent George Cecil. "Pulling the loader, it loads out eleven pay yards every 30 seconds. And it's the only machine we've found that can do a good lugging job with this big loader!"

That's another way of saying International's TD-24 is the most powerful crawler built—the hands-down champ at any job where the pay-off is for more production, stamina and "handle-ability." You can turn with power on both tracks. You can shift "on-the-go." You get going fast, with push-button starting, in any weather.

Look at the record. Ask your friends in the business. Ask your International Industrial Distributor for the low-down on the TD-24. And, times being what they are, ask him about his expert field service and big-time shop facilities for the hard-working years ahead. You'll be a TD-24 man from then on in!

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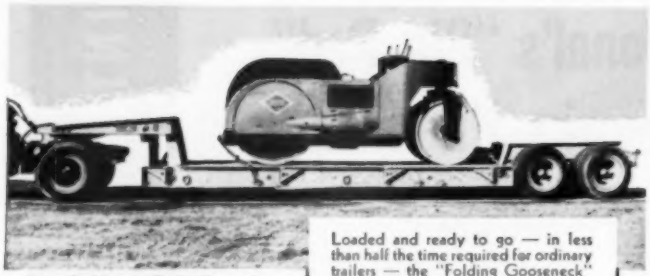
POWER THAT PAYS

A WINNER FOR WINKELMAN! This big red TD-24 really pays off, loading 22 pay yards a minute for D. W. Winkelman on a job near Syracuse, New York.



Loaded and ready to go — in less than half the time required for ordinary trailers — the "Folding Gooseneck" provides greater clearance for viaducts, wires and other obstructions . . . allows faster, safer travel.

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MARTIN Trailer

KEWANEE ILLINOIS

Gulf Freeway

Continued from page 19

of Gunite applied over a 4x4-in. 10-gauge welded wire reinforcing mat.

Powered by a Chicago Pneumatic, 500-PO-8 portable air compressor, the model N-2 Gunite gun sprayed 94,500 square feet of Gunite, two inches thick. Using two men at the nozzle, dry-mixed cement and sand from a two sack Koehring concrete mixer, sprayed to the desired level by six or eight passes of the gun. One of the men at the nozzle uses a hooked pole to lift the mat enough to let the Gunite seat firmly under it.

Build Service Strips

While this work was progressing, the service roads at each side of the expressway were being made ready for heavy traffic to be rerouted around the master interchange now building, and allow the traffic to continue to Highway 35.

The construction of the frontage or service lanes is similar to the Freeway lanes. After topsoil is removed by the Tournapulls, and Caterpillar scrapers, a 6-in. sub-soil base course is compacted to the 100% Proctor density; the asphalt membrane is poured, and then a 6-in. shell base course is applied in 3-in. lifts, and wet-blade rolled to density specifications. Then a coat of O.A. 175 asphalt is poured, and this covered with a sifting of pea gravel, to allow these lanes to stand up under traffic and to be used as haul roads before the concrete is laid.

Bad weather has hindered an orderly sequence of operations on this job. Many earth moving operations, started in February and early March, had to be postponed because of the heavy going. However, Superintendent Ed Strickler has cut idle time to a minimum; but shifting around to workable locations has increased his costs.

The bulk of the earth moving at present is centered at the LaPorte master interchange section. While the ground level roads and the embankments are being constructed, the concrete columns for bridge structures are being completed above ground, and the forms constructed for caps.

At one overpass site, a 305 Koehring, swinging a ¾-yd. clamshell bucket, was removing excess material near the bridge footings to a spot where the Tournapulls could scoop it up for the embankments. This required

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skillful handling by the crane operator to avoid damage to the fresh concrete shafts.

When the embankments have been built to proper grade and compacted, a coat of O.A. 55 asphalt spread one gallon to the square yard is applied by the distributors, to top and sides. Following this is a 6-in. flexible base course and then a coat of O.A. 175 asphalt on the road-top of the embankment approaches.

Position Bridge Steel

In the meantime, a Bucyrus-Erie 54-B crane is placing the continuous unit steel beams at the bridge sites.

When the slab forms for bridges and piers are ready, transit mixed concrete from a local supplier is lifted from the mixers and poured by a self-propelled model 357 Unit crane, powered by Chrysler gas engine, and swinging a 1½-yd. special concrete bucket. Earth fill and paving is designed to carry a wheel load of 14,000 pounds.

All backfill behind the bridge abutments are placed with soil-cement, which consists of low grade, non-settling concrete, using base coarse materials for aggregate and three bags of cement per yard of concrete.

The Turnabatch, Koehring 34-E paver, powered by a Hercules gas engine, handles the paving on all construction except bridges, in conjunction with a Jaeger-Lakewood transverse finisher with bull float for slab.

All aggregate is delivered to the Farnsworth-Chambers material yard at the job site just south of the Griggs Road structure, by rail from Eagle Lake, Texas. A spur track has been laid directly to the stock piles.

Here, aggregate is loaded to Ford 6-yd. dump trucks by a C. S. Johnson gravel scale; cement is loaded from railroad cars to a C. S. Johnson cement scale, powered by a Waukesha gas engine and holding 5,600 pounds of cement to the bin.

A 301 Koehring dragline with a ¾-yd. Owens bucket keeps the aggregate hoppers full.

Farnsworth-Chambers Co., Inc. expects to complete these contracts by January, 1952. Personnel include: Ed Strickler, superintendent; George Strickler, in charge of underground construction; and T. O. Wakeman, office manager and timekeeper. D. N. Chambers is the president of Farnsworth-Chambers Co., Inc.

LaPorte Road Job

An offshoot of the Gulf Freeway system is the new LaPorte Road which starts with the interchange now being constructed by Farnsworth-Chambers and will extend to the Houston Ship Channel. Starting in January 1951, prime contractor Gulf Bitulithic Co., Houston, expects to complete this $2½ million contract in 18 months, if they can get delivery on steel.

This is a joint venture with F. M. Reeves and Sons of Austin, Texas. Gulf Bitulithic handles the administrative end and Reeves the structures. John G. Holland Construction Co., Houston, is doing all underground work under a sub-contract from Gulf Bitulithic.

When the job was visited in February of this year, Gulf Bitulithic was clearing and grubbing approximately 28 acres of pine and oak trees from the right of way, under the direction of J. S. Lee, foreman.

Move Large Trees

Although many of the trees were large and deep-rooted, they were easily snagged out by an International TD-18 crawler, mounting a Bucyrus-Erie bulldozer blade in front, and a contractor built A frame winch on the rear.

A steel cable from the rear of the TD-18 looped around the tree trunk usually did the job, but a tough one required the assistance of a D7 Caterpillar crawler, pushing its blade against the opposite side of the tree.

The trees are cut into 6-ft. lengths by a local woodcutter, who sells the trees to a paper mill.

Gulf Bitulithic then bulldozes the debris with Caterpillar D7's into piles for burning. The large stumps are loaded by a Lorain model 41 dragline, using a chain lift, to locally owned dump trucks. Averaging about 35 big stumps per hour, the trucks haul them about a mile to the old Plum Creek Channel, where they are pushed over the edge by a Cat D7 bulldozer.

Robert B. Little, project manager for Gulf Bitulithic, says this seems to be the cheapest method of handling this chore. Little expects the clearing to be completed about the middle of March, and will then start stripping to the same specifications as for the Gulf Freeway proper.

All stripping, excavating, structures, and paving will be performed according to Gulf Freeway specifications.

While clearing was going along at a good rate, near the crossing of Highway 75, underground sewer work was getting a good start.

A 1927 model 224 Buckeye ditcher, powered by a Twin-City gas engine, was on hand to dig the 12 to 14-ft. mains and a 160 Buckeye ditcher was working on the shallower mains near the old LaPorte Road.

All sewers on this contract are precast pipe ranging from 60 inches down to 18 inches in diameter, and are laid with a contractor built rig using a special U hook to lift the pipe to the trench.

Pack Fill with Air Hammers

Fill is being tamped in 1-ft. lifts by hand labor using flathead jackhammers, powered by a 105 Worthington Compressor.

The soil on this contract area is not as tough to work as that of the regular Freeway, and with a break from the weatherman, Bob Little expects to cut a lot of dirt when he gets started excavating about the middle of April.

Personnel on the job for Gulf Bitulithic includes: Robert B. Little, project manager and J. S. Lee, foreman, clearing and excavating. E. B. Cape is president of the company.

Representing the Texas State Highway Commission are: W. J. VanLondon, Houston Urban Engineer-Manager (Designer and sparkplug of entire Freeway project); Joe Delk, resident engineer in the field on all Freeway construction; and F. A. Harris, soil engineer.

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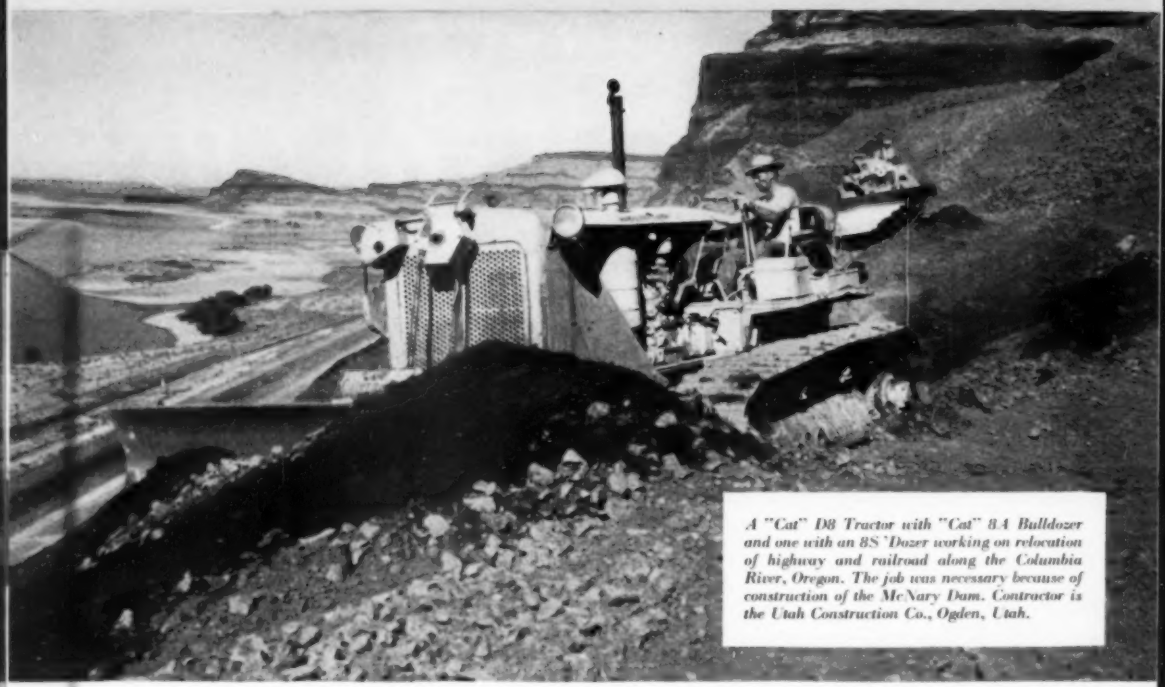


A "Cat" D8 Tractor with "Cat" 8A Bulldozer and one with an 8S 'Dozer working on relocation of highway and railroad along the Columbia River, Oregon. The job was necessary because of construction of the McNary Dam. Contractor is the Utah Construction Co., Ogden, Utah.

IF YOU WANT TO HELP YOUR COUNTRY— AND YOURSELF AT THE SAME TIME— READ EVERY WORD ON THESE TWO PAGES

Keeping equipment *on the job* is of prime importance today—to the nation as well as the contractor. The Military plans to spend 8 to 9 billions on construction in the next 18 months. And a production *backlog* of 52 billions was carried over into 1951 for bridges, roads, earthwork, government work, waterworks and other essential projects.

Right now there is a shortage of materials with which to build urgently needed machines and parts. Military and Defense Rated Orders get the nod over unclassified civilian needs. Steel and other materials are in short supply. This means that you—with our help—must get every last machine-power hour out of the equipment and parts you now have.

Down-time will not only weaken the defense effort, it can put the contractor himself in the hole. To get future business, he must get current jobs done without penalty or sacrificing his bond. Down-time means bad distribution of equipment: it means costly damage to equipment forced to do work it's not built to handle.

So to stay in business profitably, and help America arm for defense, do these things now:

1 Use equipment properly. "Cat" machines are built for hard use—not abuse.

2 Give *extra* attention *now* to preventive maintenance (see next page).

3 Have your equipment superintendent plan *ways and means* with your "Caterpillar" dealer. His maintenance responsibility begins where your operators' and mechanics' responsibility ends. He has the skilled servicemen and equipment to rework and rebuild worn parts to keep your machines on the job longer.

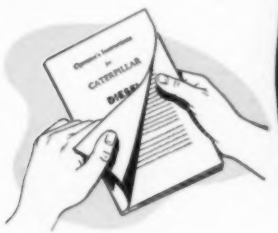
CATERPILLAR TRACTOR CO. • PEORIA, ILLINOIS

The last war showed the Military that "Cat" Earthmoving Equipment was as important to defense and offense as tanks. Here Sgt. Robert Chrisman operates a "Cat" D7 Tractor with matching blade on Davison airstrip at Ft. Belvoir, Va.

job ahead!

You're the Doctor

Today no owner can afford to think of direct costs alone. Good care of equipment can mean the difference between a producing machine and one laid up for repairs. To see how good care can save many hours of equipment life, reread your Operator's Instruction Book often and follow these suggestions.



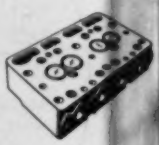
• DUST

Think of dust as Machine Enemy No. 1. A few grains today—a few more tomorrow—and soon the result adds up to serious wear. Dust or dirt plugged breathers or air cleaners—use of dirty oil containers—loose intake manifolds—loose inspection covers—dirty clutch compartment—failure to wash flywheel clutch compartment—worn seals on crankshaft—defective gaskets—failure to clean oil filter openings . . . these are some of the vulnerable spots.

• TRACK ASSEMBLY

Don't let abusive use or neglect cripple the service life of your track assembly. Track adjustment and lubrication of rollers, carrier rollers and idlers are your job. Before excessive wear occurs on grousers, links, pins, bushings, idlers, rollers and sprockets, call in your "Caterpillar" dealer. He can build up grousers, rollers, idlers and links, and replace sprocket rims and turn pins and bushings so you will have many additional hours of service.

• CYLINDER HEADS



Prevent cracked cylinder heads by avoiding overheating, freezing, scale deposits, filling a hot engine with cold water, pulling heads down too tight, and other poor maintenance practices. Your "Caterpillar" dealer can repair most cracked cylinder heads. He can replace worn valve seats with valve inserts and restore the rocker arm mechanism to serviceable limits. Consult your Operator's Instruction Book for proper cooling system and valve care.

• COOLING

Don't let your engine overheat. Keep the cooling system free of scale, rust and sediment. Use soft or treated water, and when freezing temperatures exist, protect your engine with anti-freeze. Clean the radiator regularly with chemical flushing solutions. Remove foreign matter from the core by brushing or washing. Prevent engine troubles which come with overheating. Consult your Operator's Instruction Book for proper cooling system care.

• LUBRICATION

Careful lubrication practices will add much to your satisfaction through equipment performance, economy and long life. Use *only* recommended lubricants, changing the lubricant at proper intervals. And use *only* "Caterpillar"-proved filter elements. Remove dirt from fittings and clean around the crankcase filler cap before adding oil. A little care saves many hours of engine life. Consult the lubrication chart in your Operator's Instruction Book.

• PISTONS AND LINERS

Almost all the piston wear occurs in the upper ring groove. Your "Caterpillar" dealer can renew your pistons by machining the upper ring groove for a wide ring, many sizes of which are chrome plated. Worn liners can be deglazed and put back to work for many additional hours of service life. Consult your Operator's Instruction Book for information on lubrication and the oil cooling system.

CATERPILLAR

REG. U. S. PAT. OFF.

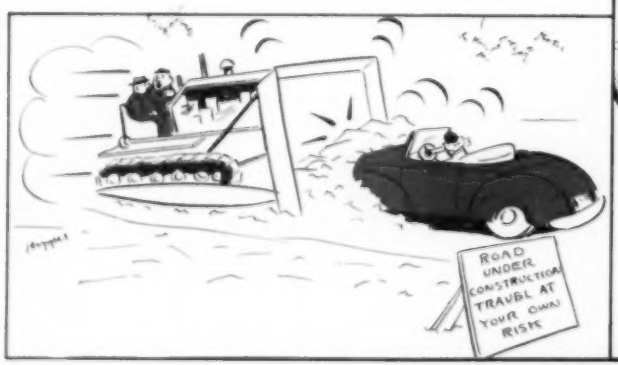
DIESEL ENGINES • TRACTORS • MOTOR GRADERS • EARTHMOVING EQUIPMENT

EX LAFFS

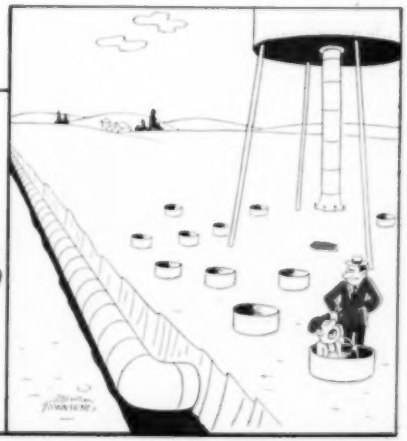
"Let's freshen up a bit while we're waiting for the boys."

"I don't care if it is an emergency—I want my sign back!"

"We overlooked one factor when we bid on this job!"



"Did you hear a horn?"



"Don't be so impatient! I'll come up under the tank yet!"

4-wheel drive 1½-yd. Model HM PAYLOADER on New Jersey Turnpike, George M. Brewster & Son, Inc., contractor.

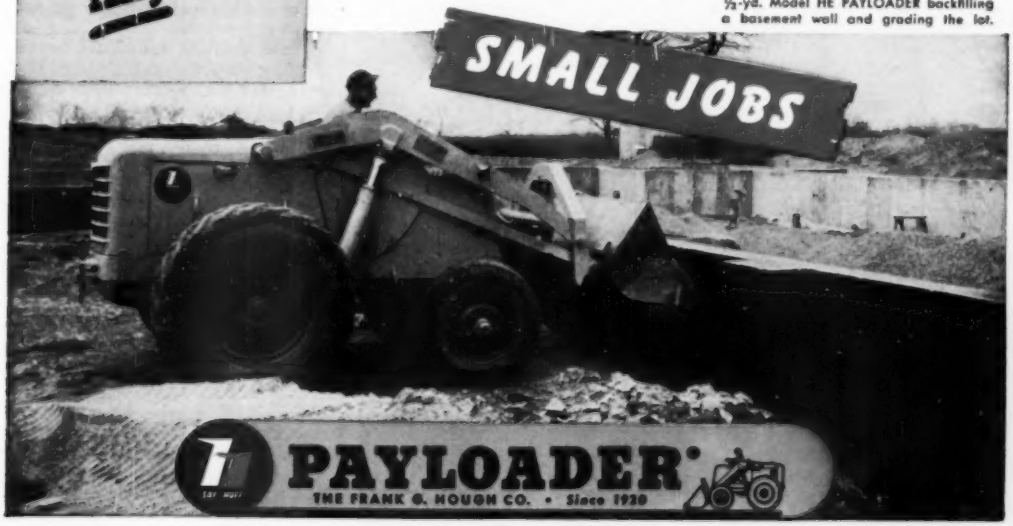
PAYLOADERS Pay Off on Any Job

Big or small — tough or easy — any job is a Payloader job . . . because only a PAYLOADER is completely designed for its purpose.

Only the PAYLOADER gives you the high multiple forward and reverse speeds . . . the engine over wheels for maximum traction . . . the powerful shovel crowding action . . . the simplicity of design for maintenance economy . . . the tip-back bucket to assure full loads . . . the dependability of large heavy duty clutches...the rugged overall construction and complete operator comfort and visibility which means more working hours per shift.

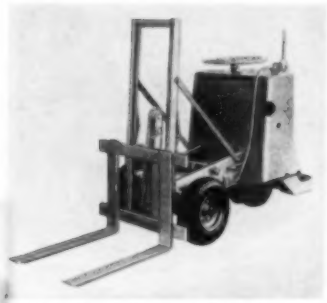
That's why many of America's progressive contractors, large and small, own fleets of PAYLOADERS; why Public Bodies rely on PAYLOADERS; why you too should investigate these high speed, rugged tractor-shovels. There's a size of PAYLOADER to fit your job; 12 cu. ft.; ½-yd.; ¾-yd.; 1¼-yd.; 1½-yd. See your Hough Distributor or write The Frank G. Hough Co., 708 Sunnyside Avenue, Libertyville, Illinois.

½-yd. Model HE PAYLOADER backfilling a basement wall and grading the lot.



Equipment
You Ought to Know About

Fork Lift



Manufacturer: Kwik-Mix Co., Port Washington, Wis.

Claims: Designed to speed material handling operations in industrial plants, shops and in construction work, the new power driven fork lift greatly increases the versatility of the Moto-Bug by quick handling of pallets, boxes, barrels, crates and other bulky objects. It has a 1,000-lb. lift capacity and raises the load to a maximum height of 30 inches.

To assure a better load balance, forks tilt to the rear when being raised and are adjustable to a maximum width of 33 inches. Standard forks are 20 inches long; 30-in. forks are optional. The Moto-Bug handles easily in close quarters, narrow aisles and through doorways. Direct steering to dual rear wheels allows machine to turn in its own length. A 4-hp. gasoline engine furnishes ample power for both forward and reverse travel and lifting loads.

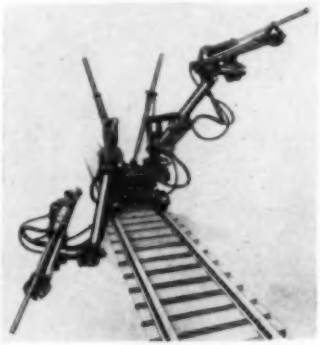
Tunnel Drill

Manufacturer: Ingersoll-Rand Co., Phillipsburg, N. J.

Claims: This standard machine has been designed for high-speed driving of drifts, cross-cuts and tunnels. It is capable of working in an opening with a maximum height of 10 feet and a width of 12 feet. The booms can also be purchased separately for mounting on jumbos for large tunnels.

The booms are raised or lowered into drilling position in a matter of seconds by powerful I-R air motors, relieving the operator of all manual lifting. Control valves for the air motors can be operated from either side of the boom and power-feed and drill controls are also within easy reach of the operator. Booms are made of heavy seamless steel tubing with heavy vertical supports.

A self-locking worm gear operates a screw drive for raising or lowering the



booms giving double insurance against creeping or settling.

There is no danger of the booms dropping when the air is shut off. The booms may be swung in either direction merely by loosening one nut. When locked they are rigidly held in the desired position by a double-tapered clamp.

Two ceiling jacks, having a total rating of 32 tons pressure, hold the jumbo in the desired drilling position regardless of overbreaks or high ceilings. An optional hydraulic ceiling jack is also available.

Improved Dump

Manufacturer: Easton Car & Construction Co., Easton, Pa.

Claims: Improved doorless TP provides a 12% increase in water level capacity, with no increase in overall dimensions. Load distribution has been improved to place more load on the fifth wheel, thus providing better traction on the tractor axle. The TP trail-

A PAYLOAD . . . EVERY CAST!
Omaha Dragline Buckets dig in faster, fill quicker, and dump cleaner because 40 years experience in building buckets have made them the tops in the field. Available in four types. Write today for catalog giving complete description and specifications.
OMAHA
DRAGLINE BUCKETS
DRAKE-WILLIAMS-MOUNT • OMAHA, NEBR.

er is furnished as a complete unit, with an Easton permanently coupled, rubber mounted fifth wheel, with mounting brackets and bolts as illustrated. Mounting plates for the fifth wheel, and tractor frame cover plate with attachments, are available but

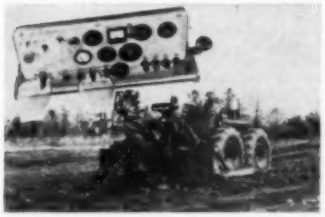
not included. An S.A.E. king pin and skin plate, including an automatic type fifth wheel, may be furnished.

The new all-welded body design features a new and stronger edge construction. Box section reinforcements are used throughout. A 3-in. oak floor cushion and replaceable carbon steel liner plate protect and reinforce the body floor. To protect the sloping sides of the body in handling heavier or more abrasive materials (such as iron ore) replaceable side liner plates may be specified. For extremely severe service all liner plates may be of heat treated alloy steel.

Dozer Improvements

Manufacturer: R. G. LeTourneau, Inc., Peoria, Ill.

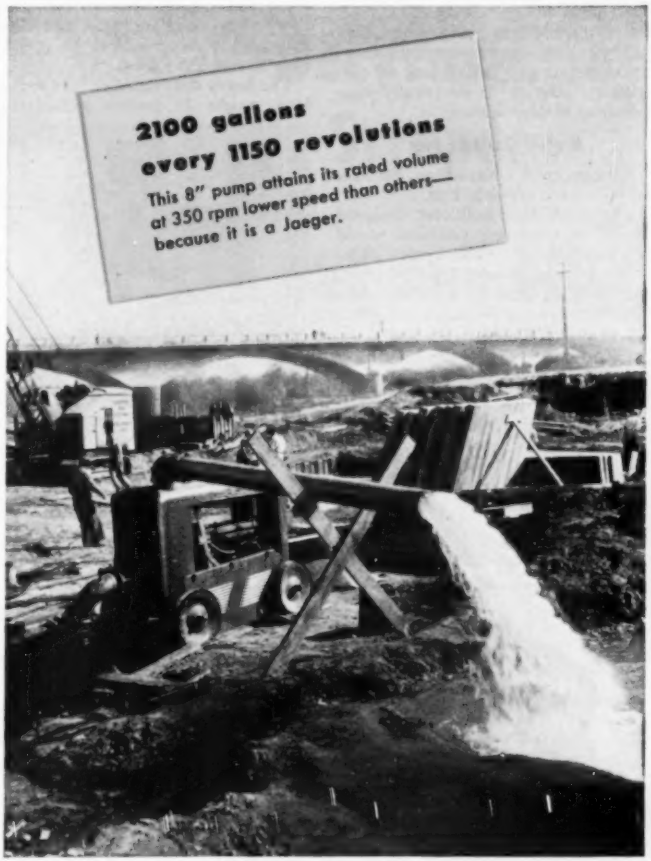
Claims: Torque converter and electric control is now available on the Super C Tournadozer. The torque converter is a single-stage type, which acts



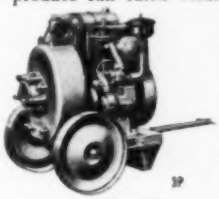
as an automatic hydraulic transmission, combining the advantages of a hydraulic torque converter and a hydraulic coupling. It transmits and selects the proper ratio for delivering power to the wheels and provides a shock load cushion between the engine and the drive wheels which allows the engine to operate at maximum rpm. Lugging of the engine is eliminated.

The various gears in the constant-mesh, air-actuated Tournamatic transmission now are controlled by electro-

JAEGERS pull stronger, pump longer


2100 gallons
every 1150 revolutions
This 8" pump attains its rated volume at 350 rpm lower speed than others—because it is a Jaeger.

Because Jaeger dewatering pumps are built oversize, to produce full rated volume at easier speeds, they also hold more priming water and are subject to less abrasive wear. Combined with double priming action and positively lubricated seal (Jaeger patents) they insure fast, sure priming without vapor lock on the toughest pulls, sustained efficiency on non-stop pumping, and thousands of extra hours of service from both pumps and engines.



Other sizes 1½" to 10".

See your Jaeger distributor or send for Catalog P-10.

THE JAEGER MACHINE CO.

553 Dublin Ave., Columbus 16, Ohio

COMPRESSORS • MIXERS • HOISTS • TOWERS • PAVING MACHINERY

magnetic valves placed in the air lines going to the clutches which engage the transmission gears. These valves are controlled by four push-pull finger tip switches mounted on the dash panel. With finger tip electric control, air actuated transmission gear changes into higher or lower ratios are instantaneous, thereby eliminating loss of momentum. Steering is electrically controlled with toggle switch.

Baby Bulldozer

Manufacturer: Ransomes, Sims & Jefferies Ltd., Ipswich, Eng.

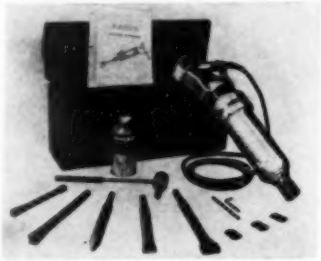
Claims: A small bulldozer, designed for use where larger machines would be unsuited or uneconomic. This bulldozer may be used for land clearance, leveling, grading, filling trenches, roadmaking, snow clearance and shifting of coal, coke, sand and gravel.

Electric Hammer

Manufacturer: Allied Tools, Inc., Newark, N. J.

Claims: Kango Electric Hammer line consists of three size hammers: heavy duty, medium duty and light duty and a large variety of special tools to suit many jobs.

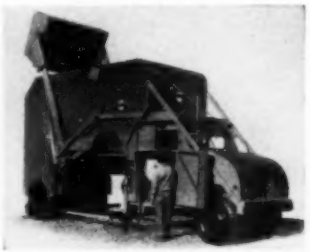
The heavy duty hammer is 22 inches long, weighs 21 pounds and strikes



1,300 blows per minute, and pound for pound it is the most powerful electric hammer made. There are 53 different tools and 119 additional variations of them.

The Kango Hammer consists of a striker reciprocated by two centrifugal weights. The weights are attached to bevel gearing which, in turn is driven through a spline shaft by a specially developed rugged electric motor. These hammers are designed to effect faster production and give less fatigue to operators.

A metal carrying case and a selection of tools is supplied with each hammer.



Portable Mix Plant

Manufacturer: Mixermobile Manufacturers, Portland 20, Ore.

Claims: Portable concrete unit, combined with Mixermobile portable concrete mixing and elevating unit and Scoopmobile, makes portable field concrete mixing plant with a capacity of up to 50 yards per hour. The mobile field plant handles production from raw materials to mixed and poured

Continued on page 48

Send for Bulletin 2373 Today!

The ONLY book available that tells...

• HOW TO SAVE YOUR BUCKET

Among the many "bucket saver" suggestions are a list of "do's" and "don'ts" on the use and abuse of clamshell buckets; tips on how to prolong cable life; common operating mistakes that make bucket lips bow in or bend out.

• HOW TO GET MORE OUT OF YOUR BUCKET

"How to Reeve the Bucket for Maximum Efficiency" is illustrated and described in detail. One page is devoted to instructions for operators.

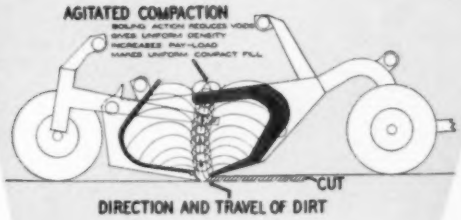
• HOW TO REPAIR BUCKETS

Methods of renewing the cutting edges of worn bucket lips with special welding precautions. This section also contains instructions for removing and replacing ball bearings in lever arm sheaves, lubrication instructions, and many other practical hints for bucket care and maintenance.

BLAW-KNOX DIVISION
of Blaw-Knox Company
2074 Farmers Bank Building • Pittsburgh 22, Pa.

BLAW-KNOX CLAMSHELL BUCKETS
THE MOST COMPLETE RANGE OF SIZES AND TYPES

It's BOILING ACTION that helps Bucyrus-Erie Scrapers *Load* FAST and FULL



HERE'S WHAT BOILING ACTION IS

Bucyrus-Erie Scrapers bite into dirt sharply and cleanly . . . funnel it up through the center of the load . . . spread it out evenly on top. Because of this action, the bowl fills quickly and completely by the most direct route — through the middle. As the dirt boils up, it is churned thoroughly, breaks down into small pieces to minimize waste air space.

CAPACITIES

S-Type
4 to 10 cu. yd.
B-Type
16 and 22 cu. yd.

WHAT IT MEANS TO YOU

You load faster. You load more dirt. You do both on shorter runs. Combine these time-saving and payload-boosting advantages with Bucyrus-Erie's fast hauling, swift dumping and rapid turning and you get unmatched scraper performance.

SOUTH MILWAUKEE BUCYRUS ERIE WISCONSIN

See Your INTERNATIONAL Industrial Tractor Distributor

In 6 months 1000 hours of

FAST DUMP... body raises at touch of electric switch . . . streamlined bowl clears loads instantly.

Hauling sandstone and gravel in tight quarters, 2 C Tournarockers speed Connecticut road jobs for Fred Onuparik Construction Co.

At New Haven, Connecticut, Fred Onuparik Construction Company tackled a difficult hauling problem. The job involved moving 70,000 cubic yards of sandstone from a short 1700′ stretch to relocate heavily-traveled U. S. 1 around the city's business district. Both loading and dumping areas were narrow and restricted . . . haul roads, rocky and rough. Mobile, high-speed, off-road haulers were needed for lowest cost operation . . . Onuparik's LeTourneau Distributor had the answer . . . 2 rear-dump, 16-ton C Tournarockers.

Teamed with a 1¾-yd. shovel and working 2000′ cycles, the 2 big, rubber-tired "C's" delivered up to 1200 cubic yards of heavy shot rock per day. Each 16-ton rig took 8 to 10 passes from the well-heaped dipper . . . carried 10 pay yards per load. "We're very well pleased with this performance," reports Owner Fred Onuparik, who later used his 2 LeTourneau rear-dump haulers on a 55,000-yd. relocation of Connecticut State Rt. 109 between Thomaston and Watertown.

Handling mostly rock and gravel, Onuparik's rigs worked approximately 1000 hours on these 2 jobs, with a mechanical operating efficiency of 98%. Both 165 h.p. "C's" were driven job-to-job under their own power . . . completing the 45-mile trip from New Haven to Thomaston through very heavy main highway traffic in 3 hours.

Ability to maintain high standards of output and mechanical efficiency under all job conditions is the reason why progressive dirtmovers like Onuparik are turning to rear-dump Tournarockers for low-cost hauling of rock, gravel, and other materials. Your LeTourneau Distributor will be glad to show you job-proved facts and production figures on new 18-ton "C's", as well as on 9, 35, and 50-ton Tournarockers. Call him, or write TODAY.

LETOURNEAU PEORIA ILLINOIS **TOURNAROCKERS**

operation...98% efficient

BIG TARGET... Tournarocker's 12' x 8' top opening speeds shovel loading ... reduces spillage.

Job No. 1 **Cutting 70,000-yd. by-pass for U. S. 1 around New Haven business district, each of these 35 m.p.h. C Tournarockers hauled 600 pay yds. of sandstone per day on 2000' cycles. Entire job was only 1700' long, with all excavation made at this end of the area.**

Job No. 2 **To relocate Rt. 109 near Watertown, Tournarockers moved 40,000 yds. of rock and 15,000 yds. of gravel on very short hauls (average, 500 ft., one-way). "They're the best hauling units I've seen for limited working areas," says Master Mechanic Phil Onuparik.**

HIGH SPEED on RUBBER PLUS TRACTION ADVANTAGES of a CRAWLER

LeTOURNEAU LeT EQUIPMENT

Like the Camel.. IT GETS DOWN!

For EASIEST possible LOADING, the frame is lowered to ground WITHOUT BLOCKING.

FOR EASIER LOADING!

Maximum deck height of ONLY 16 INCHES assures RAPID, SAFE LOADING of equipment.

ROGERS POWER LIFT DETACHABLE GOOSENECK TRAILER

PATENTS PENDING

5 EXCLUSIVE ADVANTAGES

1. Carries heavier loads on larger tires.
2. Detaches quickly for fast, easy front loading.
3. Stoops to clear low overhead obstructions.
4. Raises its deck to clear high banked crossings.
5. Is detached, loaded and reattached in 5 minutes.

Yes, with this unique trailer you can detach the gooseneck, load up, reattach the gooseneck and drive off in a matter of ONLY 5 MINUTES.

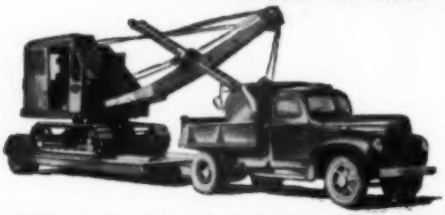
Complete Literature available upon request—Any Rogers Dealer will demonstrate its features right on your desk, with an OPERATING SCALE MODEL.

EXPERIENCE builds 'em ROGERS PERFORMANCE sells 'em

ROGERS BROS. CORP.

ALBION, PENNA.

136 ORCHARD STREET



Also of timely interest is this ROGERS Tag-A-Long trailer which makes a dump truck serve as a tractor and effects sizeable savings for contractors.

New Equipment

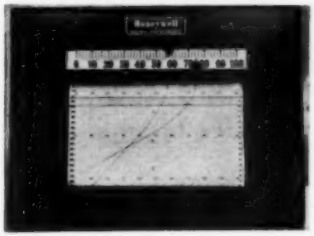
Continued from page 44

concrete with only one operator on each of the three units.

Unit weight-batches aggregate on the job. It can be charged from storage piles or directly from dump trucks. Three 7-yd. bins and a 2-yd. skip store up to 23 yards of aggregate. A single operator handles the portable unit which can be set into operation in 15 minutes.

The Weigh Batcher is mounted on 3:25 x 20 tires and travels at normal highway speeds. It is powered with a gasoline engine. Total weight of the unit is 17,800 pounds. It is 12 feet high, 8 feet wide and has an over-all length of 28 feet with the charging skip down. It can be equipped with either dial or beam scales to weigh aggregate.

Electronic Recorder



Manufacturer: Minneapolis-Honeywell Regulator Co., Philadelphia 44, Pa.

Claims: Simultaneous recording of radioactivity and rock strata resistance in underground drilling operations is done by an electronic recording instrument in a single operation. The device is valuable in searching or drilling for oils, minerals and water. The simultaneous recordings of the new device requires only one recording "pass," permitting speedy withdrawal of an entire electrode from a well.

Crawler Snow Plow

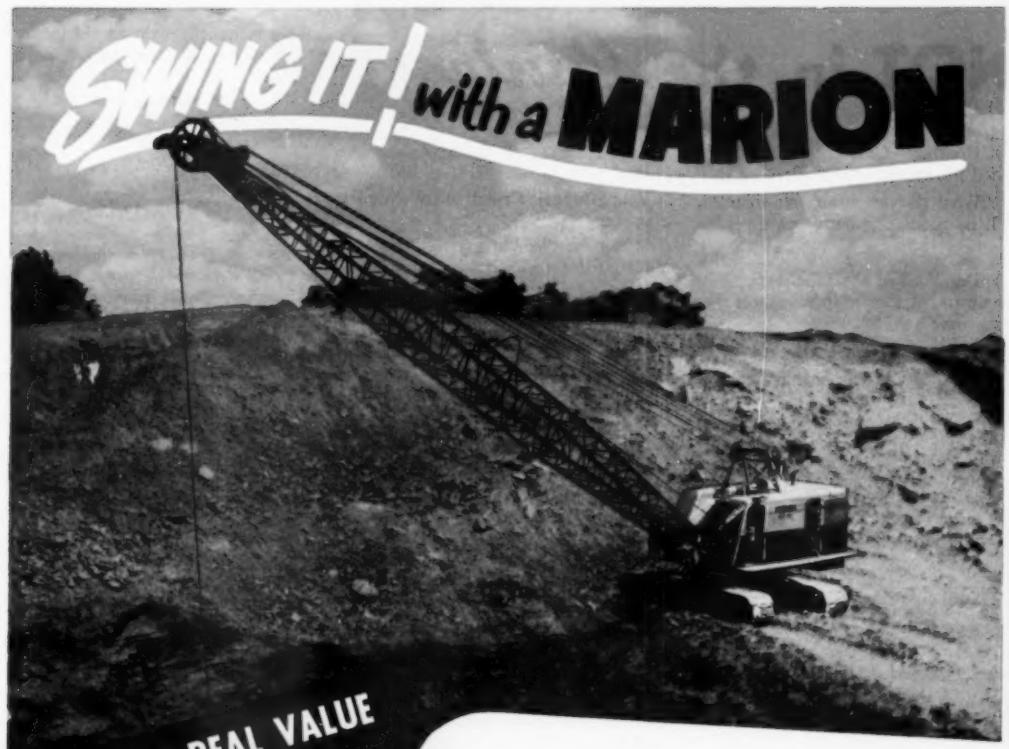
Manufacturer: Wm. Bros Boiler & Mfg. Co., Minneapolis 14, Minn.

Claims: Tractor-mounted rotary snow plow is a special adaptation of the Bros Sno-Flyr, previously mounted only on trucks and motor grader patrols. Designed to mount on a Caterpillar D7, this rotary-crawler combination has maneuverability under the toughest conditions with crawler versatility in close quarters, plus five forward and four reverse speeds for instant, graduated power, applied as needed.

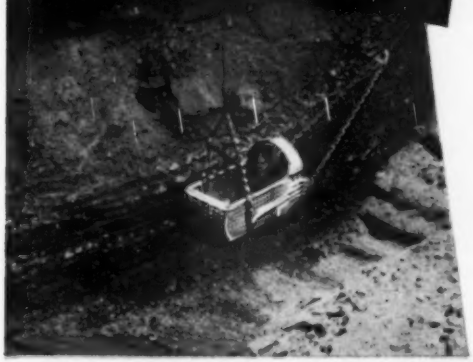
Power to drive plow and rotors comes from two engines mounted on a

Continued on page 54

SWING IT! with a MARION



And Get REAL VALUE in DRAGLINES



Want to get more for your dragline dollars?

If so, consider what it takes to make a dragline great.

MARION, in more than 65 years of progress, knows there are no substitutes for experienced design, quality materials and careful workmanship if a dragline is to do its job well and faithfully over the years.

MARION builds draglines to **do a job**—not just to "get by" or to "meet a price." MARION builds a size and type to meet every need.

Let your nearest MARION Sales Representative or Distributor show you how easy it is to own today's outstanding Dragline Value.

MARION POWER SHOVEL CO.
MARION, OHIO, U. S. A.

OFFICES AND WAREHOUSES IN ALL PRINCIPAL CITIES

from 3½ cu. yd. to 45 cu. yds.

NOT in the *Contract*

"Honestly, Chester, can't you be good for five minutes?"

"What do you mean, five minutes? I'll be good for twenty years yet."

"Dad," asked the small boy, "Why is a man not allowed to have more than one wife?"

"My son," replied the father, "when you are older you will realize that the law protects those who are incapable of protecting themselves."

With all these poems about the rabbit,
And all about the rabbit's habit,
What would we do
For rabbit stew
If rabbits didn't have habits?

Sailor's wife: "Remember when we were first married — you used to say I had a shape like a beautiful ship?"

Sailor: "Yeah, but your cargo has shifted."

A prospective groom went into a jewelry store.

Young Man: "I want to see a wedding ring."

Salesman: "Would you like to see our special three-piece combination?"

Young Man: "What's that?"

Salesman: "Engagement, wedding and teething!"

An outbreak of smallpox in a southern city caused an order to be issued for the immediate vaccination of all citizens who had not been thus immunized within a year. To facilitate the work, each voting precinct had its own vaccination unit and residents were required to report to it as soon as possible.

A negro mammy applied at the wrong place. "Sorry mammy," said the doctor, "you'll have to be vaccinated in your precinct."

"So dat's it?" said mammy, righteously indignant. "De white ladies gits vasinated in de ahms or de laigs— and we gits it in the precink!"

"I understand it all started over that blond at Casey's beer joint."

On a moonlight night an old farmer pulled up beside a car parked on a back road.

"What's the matter, out of gas?"

"Nope."

"Carburetor plugged?"

"Nope."

"Tire down?"

"Nope. Didn't have to."

Foreman: "You are asking big pay for a man with no experience."

Applicant: "Well, running a shovel is much harder when you don't know anything about it."

Saleslady (showing lingerie to a man): "This is the only place you can touch these for anything near the price."

Zoo Visitor: "Where are the monkeys?"

Keeper: "They're in the back, making love."

Visitor: "Would they come out for some peanuts?"

Keeper: "Would you?"

Men who think they are irresistible to women are like a certain Marine. Two of the fighters were sitting in the public library, and one of them found a book that seemed to interest him a lot, for he sat for some time with his face buried in its pages. The other boy said to him: "What's the name of that book you're reading?"

The reader said: "What Millions of Women Want."

The first reached for the book.

"Lemme see," he said. "Have they got my name spelled right?"

Two old ladies enjoying the music in the park. "I think this is a minuet from Mignon," said one.

"I thought it was a waltz from Faust," said the other.

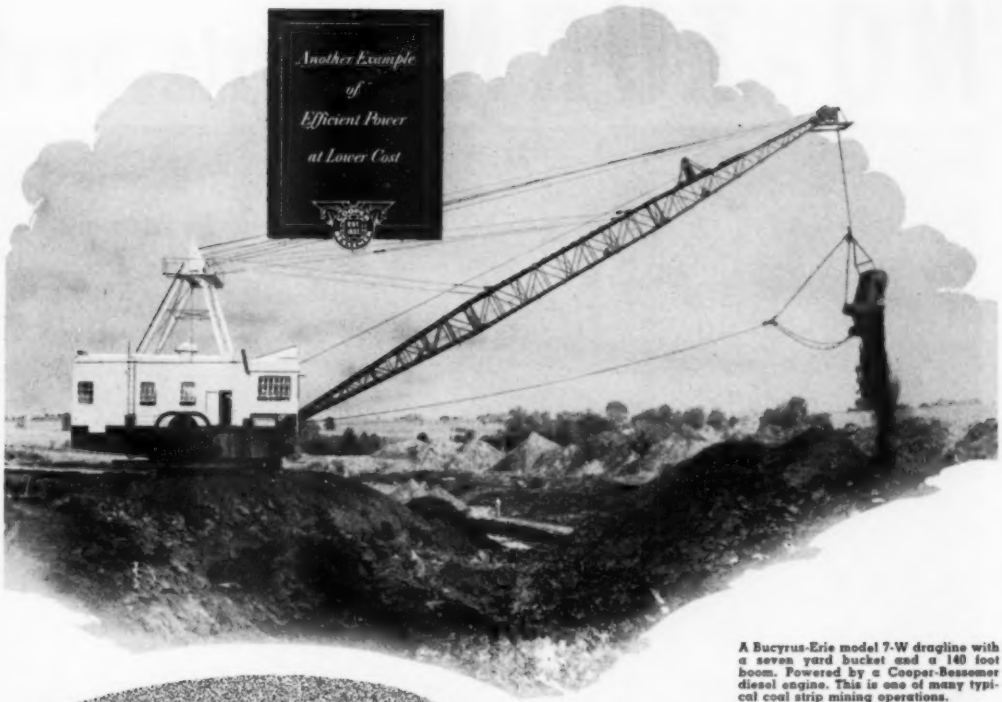
The first lady went over to what she thought was the board announcing the program.

"We're both wrong," she said when she got back. "It's a Refrain from Spitting."

The golfer had lost his ball, and, not unnaturally, was inclined to be annoyed with his caddy.

"Why the deuce didn't you watch where it went?" he asked angrily.

"Well sir," said the boy, "It don't usually go anywhere, and so it took me unprepared like."



A Bucyrus-Erie model 7-W dragline with a seven yard bucket and a 140 foot boom. Powered by a Cooper-Bessemer diesel engine. This is one of many typical coal strip mining operations.

EXTREME FLEXIBILITY

ANOTHER Cooper-Bessemer BONUS VALUE

● There's probably no other application that demands as much diesel flexibility as dragline service. It means day after day of split-second no-load-to-full-load operation at nearly constant governor-controlled speed.

Because Cooper-Bessemer diesels excel in flexibility, in *fast* response and *smooth* behavior at any load, they're preferred power on the biggest, toughest dragline jobs. It's the result of *new*, often exclusive features built into heavy duty diesels by one of the nation's *oldest* engine builders.

Cooper-Bessemer builds diesels and gas engines specially designed for all heavy duty applications—stationary, marine, locomotive and other mobile services. If you have a stake in power, get *all* the facts. Check with the nearest Cooper-Bessemer office.

The **Cooper-Bessemer** *Corporation*

MOUNT VERNON, OHIO — GROVE CITY, PENNA.

New York Washington, D. C. Bradford, Pa. San Francisco Houston, Dallas, Greggton, Pampa and Odessa, Texas Seattle Tulsa Shreveport St. Louis Los Angeles Chicago Caracas, Venezuela Cooper-Bessemer of Canada, Ltd., Halifax, Nova Scotia Gloucester, Mass. Calmes Engineering Co., New Orleans, La.

NO-TURN shuttle haul.

Dumptors®

SAVE TURN TIME GAIN HAUL TIME

On every haul cycle, Koehring fast-shuttling Dumptors eliminate slow turns — at the loading unit, at the dumping point, on sharp, "zig-zag" grades. They gain *more* productive haul time, because Koehring constant-mesh transmission gives the same 3 fast speeds forward and reverse. Here's how much no-turn shuttle operation can increase your production:

By eliminating only 2 turns on a 1,000' haul, time studies prove that Dumptors can save 30 seconds every round trip, and increase hourly yardage output over 10% per unit. What's more — fast, easy spotting and 1-second gravity dump keep production high.

Remember, too — top hauling efficiency also means increased shovel output. For *double profit protection*, team fast-shuttling Dumptors with Koehring heavy-duty excavators. Four sizes: ½-yd., ¾-yd., 1½-yd., and 2½-yd.

KOEHRING
COMPANY
MILWAUKEE 16, WISCONSIN
Subsidiaries: JOHNSON • PARSONS • KWIK-MIX

It will pay you to get complete facts from your Koehring distributor. Call him NOW.

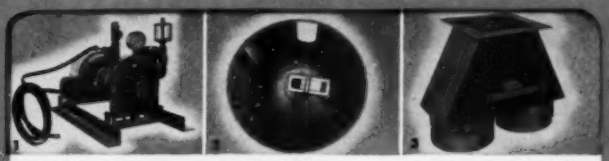
IN OPEN PITS OR UNDERGROUND

In confined underground operation, Dumptor spots fast, close to shovel . . . no need to turn. Shovel operator has short swing cycle, a big, easy-to-hit 8' x 8' target, for loading Dumptor over either end or sides.

At dump there's no slow jockeying around. Dumptor drives up, body forward; operator hits body release lever; gravity instantly dumps the 6-yd. payload in 1 second . . . Dumptor heads back without turning.

On no-turn shuttle haul, from underground to surface, loaded Dumptor leaves narrow tunnel in same position as it entered . . . travels same speeds forward and reverse . . . easily climbs 24% grades fully loaded.

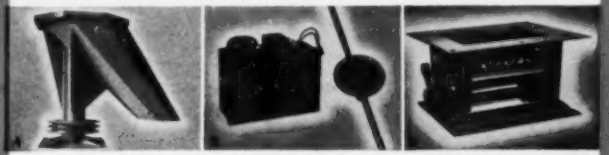
INCREASE BATCH PLANT PROFITS *with Johnson accessories*



Rotary Vane Compressor gives 7 cu. ft. air pressure per min. cement aeration. 15-lb.-limit relief valve.

Aeration Fittings properly spaced in Johnson bins and silos keep cement free flowing.

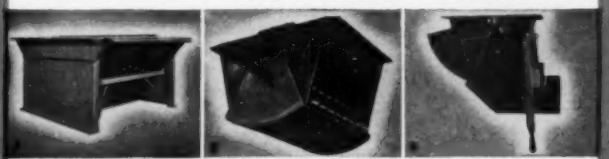
2-Way Elevator Discharge Valve, a flap-type chute, directs flow of cement to the storage tank.



Pivoted Distributor feeds aggregates to bin sections. Positions and locks by ground control wheel.

Bin Signals accurately register high and low levels in cement or aggregate. Dust-proof.

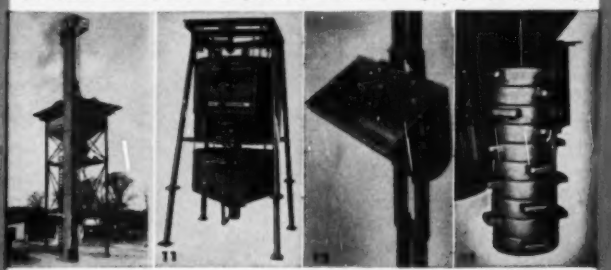
Rotary Plug Valve accurately controls cement flow. Plug operates freely in self-aligning bearings.



Receiving Hopper 30 and 50-bbl. sizes, feeds bulk cement to elevator. All-welded, weather-proof.

Aggregate Fill Valves single clam, radial type for jam-proof closing. Hydraulic pressure lubrication.

Tunnel Gate for stockpile reclamation. Single radial clam. Hinged spout opens, locks securely.



Safety Cage of 28" steel, welded to casing, can be furnished with all Johnson elevators.

Water Weigh Batchers, semi- or full-automatic types. 120 and 240-gal. sizes available.

Elevator Buckets in many sizes for aggregates, and cement. **Steel Chain** has carburized knuckles.

Batcher Test Weights in sets of ten, 50-lb. calibrated units, for checking batcher accuracy.

Mail to C. S. JOHNSON COMPANY
CHAMPAIGN, ILLINOIS
(Koehring Subsidiary)

Send us literature on items checked: 1 2 3 4 5 6 7 8 9 10 11 12 13

NAME _____ TITLE _____

COMPANY _____ EE

STREET _____

CITY _____ STATE _____ WI

New Equipment

Continued from page 48

special counterbalancing platform at rear of tractor. Diesel or gasoline engines with 200 or more hp may be used, as specified.

The entire plow assembly, driving motors and supporting frames are mounted on the D7 as a single integrated unit. With the aid of a light crane, this unit can be quickly removed in the spring to free the tractor for summer work.

Belt Conveyor

Manufacturer: The Fairfield Engineering Co., Marion, Ohio.

Claims: Light weight troughed belt conveyor handles 75 yards of sand or gravel per hour. Also handles ore, lime, cinders—virtually every type of material handling job. Standard equipment consists of a twin hydraulic boom hoist, underslung axle, slide trough, and a 4x14-in. ply belt. Lengths from 14 to 25 feet are available.

Large Loader

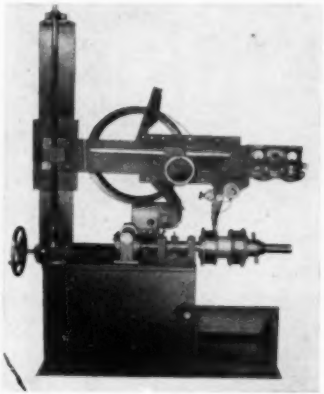
Manufacturer: Mixermobile Manufacturers, Portland 20, Ore.

Claims: The scoop bucket has a level capacity of five yards. The tires stand as tall as the average man and the whole machine weighs over 18 tons. The heavy duty 4-speed forward and reverse transmission is powered by a 4:1 planetary drive axle from a 250-hp diesel engine. The track tilt has hydraulic control and the carriage can be operated with the track in any position. The Super-Scoopmobile can be used for elevating and pouring concrete, loading and shoveling dirt and bulk materials, lifting heavy equipment and other heavy duty lifting and transporting operations.

Welding Equipment

Manufacturer: Mir-O-Col Alloy Co., Los Angeles 31, Calif.

Claims: Automatic welding and positioning equipment designed for the



rebuilding of worn equipment parts such as tractor idlers and rollers, shov-

WELLMAN *Williams Type*

FAST BUCKET OPENING SPEEDS OPERATIONS

• Double-hinge construction on Wellman's multiple-rope bucket permits faster opening than a single hinge. This speeds up operations, also gives a bigger spread in the open bucket for the same headroom.

Wellman's welded-design buckets offer you better performance and longer service. In all types and sizes you'll do better with Wellman!

Want Facts?

Write for free descriptive bulletins.

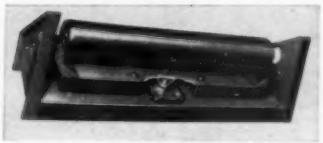
CLAMSHELL • DRAGLINE
CUSTOM-BUILT BUCKETS
STONE AND WOOD GRABS

THE WELLMAN ENGINEERING COMPANY
7000 Central Avenue
Cleveland 4, Ohio

el rollers and shafts, crusher cones, etc., makes it possible to rebuild worn parts at a fraction of new part replacement cost and assures a longer than new part wear in many cases.

The equipment utilizes the submerged arc principle of automatic welding, and an alternating current transformer type welding machine in conjunction with a work positioner capable of handling conical or cylindrical equipment parts which weigh up to 750 pounds and whose diameter is not less than four inches or greater than 36 inches. All work is held on centers, which assures a concentric build-up of the worn part.

Conveyor Idler



Manufacturer: Chain Belt Co., Milwaukee, Wis.

Claims: An improved type of self-aligning belt conveyor return idler reduces the possibility of belt damage from roving because it provides automatic alignment for the return run of the belt without the use of side guide

Play it Safe!

FASTEN WIRE ROPE WITH

CROSBY CLIPS

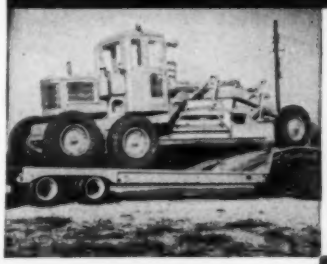
1901

America's largest-selling DROP-FORGED Fasteners!

SIZES for ⅛" to 3" WIRE ROPE
DISTRIBUTORS EVERYWHERE

AMERICAN HOIST & DERRICK CO.
ST. PAUL 1, MINNESOTA

What's Your hauling problem?

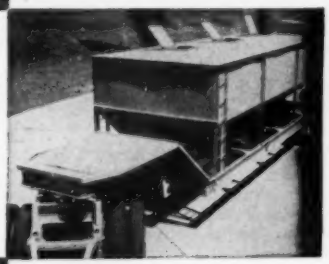


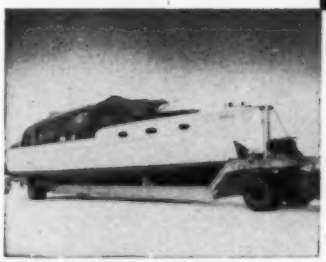
Motor Graders!

To speed hauling of motor graders within 50 to 100-mile radius, La Crosse developed this 19-ton tandem axle trailer, with special ramp for loading grader steering wheels on trailer gooseneck. Trailer idea cuts grader travel time 50% . . . saves wear on graders.

Bulk Materials!

This special La Crosse-engineered "bin trailer" eliminated high labor cost for bagging and unbagging corn starch . . . cut delivery time 90% from processing mill to finishing plant 2 miles away. Tapered La Crosse bin is equipped with worm gear unloader at bottom.





Boats, etc.!

Featuring low height and special "hull-tailored" saddles, this custom-built La Crosse trailer cut the cost of hauling a 13-ton Chris Craft over 50% per trip. It also simplifies loading and unloading . . . insures a safer ride without damage to structure or finish of boat.

Capacities 8 to 67 tons—single, dual or tandem axle LC-14R

Check Today!

LA CROSSE TRAILER CORPORATION, La Crosse, Wis.

☐ Show me how La Crosse trailers can help reduce my cost of moving .....
(Equipment or Material)

Average load: .....tons; .....ft. long
.....ft. wide.....ft. high.

Name.....

Occupation or business.....

Address.....

City.....State.....

LaCROSSE

America's Favorite LOW BED TRAILER

Increase your earnings *with* low-cost BANTAM

Thrifty production tool
For small plants!

Versatile truck-mounted Schield Bantam dragline or shovel costs *less than half the price of bigger machines* . . . digs or loads up to 90 cu. yds. of material per hr. . . . has high-speed mobility to go anywhere, over paved roads or cross country, for stripping, stockpiling, loading trucks, etc. Can also be rented out part time to counties or local contractors for extra income.

Fast swing and line speeds, plus exceptional maneuverability, often enable ⅜ yd. Bantam to outproduce larger, more expensive rigs.

Profitable Utility Rig
For big plants!

You'll find low-cost Bantam ideal for stripping overburden, cleaning up pit floor, handling materials to and from stockpiles, etc. Also permits better selection of stone for lime burning . . . saves time and money on dozens of scattered or close quarter excavating jobs, where it formerly cost more to move big equipment in and out than it did to do the work.

Write for literature
SCHIELD BANTAM CO.
202 Park St., WAVERLY, IOWA

Bantam's rugged construction with simple mechanical controls, power controlled lowering, and sealed-for-life anti-friction bearings mean easier, lower cost operation, with virtually no maintenance.

Bantam mounts on new or used truck, or half track . . . goes anywhere in a hurry . . . has 7 fast-change digging, lifting and materials handling attachments for wide work range with economical "one-man" operation.

SB-Q-2

SCHIELD BANTAM
Costs less . . . goes anywhere fast
GETS MORE JOBS DONE

rolls. It is mounted on a roller bearing turntable, with the entire assembly tilted 45° in the direction of return belt travel. Lateral movement of the belt to one side moves that side of the roll forward and because of the tilt, downward, thus decreasing belt pressure on that side. At the same time, the opposite side of the roll moves back and upward, increasing belt pressure on its side. Through this counterbalancing action, the belt automatically returns to its central position. The idler sensitively maintains an equilibrium at the center of the roll. The action is equally effective with horizontal, inclined or declined conveyors and is unaffected by build-up of material on the roll.

It is recommended that these self-aligning return idlers should be located to include one unit close to the head pulley (to immediately center the return run), one unit close to the tail pulley (to center the belt for loading), and additional units at 10 to 15 normal return idler spacings, as conditions warrant.

Materials Handling Loader

Manufacturer: Tractomotive Corp., Deerfield, Ill.

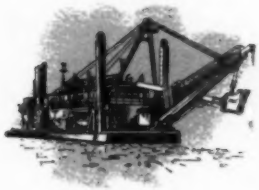
Claims: A wheel tractor loader featuring a hydraulic torque converter drive and an entirely new design clutch-type transmission is called the TL-10 Tracto-Loader. The single stage torque converter furnishes a smooth, constant flow of power to the drive wheels. There is practically no spinning of wheels while loading, and crowding action is definitely improved. Loading in a higher gear is possible, operation is easier and there is less wear and tear on clutches and other parts.

The new clutch-type transmission eliminates most gear shifting. Two multiple disc clutches are built into the transmission. One is for forward

THINGS TO THINK ABOUT WHEN BUYING A DREDGE

DESIGN

As builder of all types of dredges — dipper, placer, clamshell and hydraulic — Bucyrus-Erie is qualified to recommend without prejudice the type that best suits your needs. And to assure a design that *exactly* fits requirements of the job, experienced engineers make a careful on-the-spot study of all factors involved.



MATERIALS AND WORKMANSHIP

Bucyrus-Erie not only specifies the best materials for the job, but carefully tests them in a modern, completely equipped laboratory. The company also operates its own machine, foundry, forge and erecting shops . . . entrusts manufacturing to craftsmen with years of skill in dredge building.

EXPERIENCE AND REPUTATION OF BUILDER

Make certain that your dredge is built by a company that knows it business. During 66 years of dredge-building, Bucyrus-Erie has manufactured more than three hundred units for users all over the world — most of which are still in operation. This is a record of experience unparalleled by any other dredge manufacturer—your assurance that Bucyrus-Erie is a real dredge buy.

34B51C

BUCYRUS ERIE

SOUTH MILWAUKEE, WISCONSIN

speeds, the other for reverse. Only one clutch is engaged at a time. The operator can go forward or reverse by simply pushing or pulling one lever. His reverse speed is almost twice as fast as his forward speed. There is a selection of four forward and four reverse speed ranges.

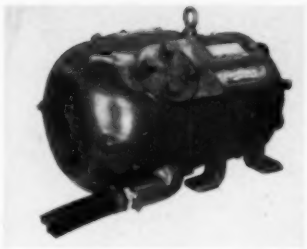
The TL-10 is mounted on rubber tires, has a ¾-yd., hydraulically controlled bucket and weighs 10,650 pounds. There is ample bucket clearance and reach to load average size dump trucks. Power is furnished by an Allis-Chalmers 40.5-brake hp gasoline engine.

Mine Motors

Manufacturer: General Electric Co., Schenectady 5, N. Y.

Claims: Explosion-proof mining motors, conforming to the Bureau of Mines Schedule 2E are available in ratings from ½ hp through 60 hp at 230, 250, 500, and 550 volts, with stabilized shunt, compound, or series windings.

All frame sizes in the line utilize two stud brush mechanisms. With this construction, all brushes are accessible through two large handhole covers in the upper half of the commutator end shield, facilitating inspection and brush replacement. Non-rusting cast bronze



handhole covers with heavy integral lugs resist corrosion and do not require special tools for removal. The motors also use a cable gland design which permits cable replacement without removing the end shield or working through the commutator access openings. Standard motors are foot mounted, but modifications can be supplied less the feet for strap mounting, or with a face or flange end shield.

Masking Compound

Manufacturer: Eutectic Welding Alloys Corp., N. Y. C. 13.

Claims: Canned in thin paste form, compound can swiftly be spread with the welding flux over the area to be protected. The dried residue is easily removed after the welding operation is completed.

CUT DIGGING COSTS

with the new Sherman Power Digger

WRITE FOR LITERATURE TODAY!

Patented, actuated bucket gives you selective digging action, better loading, greater versatility.

All-hydraulic action—made possible by heavy-duty hydraulic cylinders—assures efficient performance.

SPECIFICATIONS

Shovel reach below ground surface	8 feet
Digger reach behind tractor	10 feet
Swinging arc	140°
Trench width, standard digging shovel, single cut	18 inches
Digging shovel capacity	3.5 cu. feet
Loading shovel capacity	5 cu. feet
Loading clearance, digging shovel, loaded	7 feet
Loading clearance, loading shovel	10 feet

Standard tractor mounting gives unmatched maneuverability and transportability.

•

Digs ditches, trenches, footings, culverts, basements and other excavations.

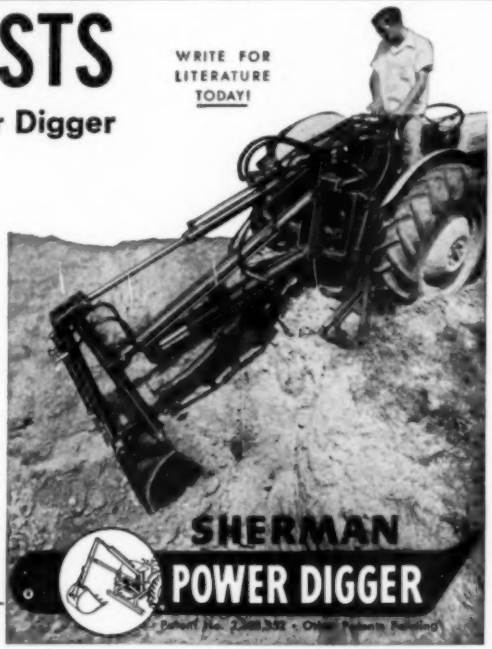
Works well behind the tractor at any angle.

•

Actuated bucket raises high enough to load standard dump truck.

•

Handles roots, rocks, hard clay and oiled road surfaces.



Designed, Engineered and Manufactured Jointly By
SHERMAN PRODUCTS, INC. • Royal Oak, Michigan
WAIN-ROY CORP. • Hubbardston, Massachusetts
Sold Exclusively By SHERMAN PRODUCTS, INC.

SHERMAN PRODUCTS INC., Department No. 113 Royal Oak, Michigan

Clutch Facings

Manufacturer: Standco Brake Lining Co., Houston, Texas.

Claims: Heavy-duty clutch facing in both the gear tooth and plain disc types is manufactured for use in the oil production, marine, earth-moving and heavy transportation equipment industries.

Wheel Measure

Manufacturer: Rolatape, Inc., Santa Monica, Calif.

Claims: Model 400 Rolatape, a measuring wheel which is exactly four feet in circumference registers distances up to 100,000 feet, then repeats cycle. It accurately measures and records as it is wheeled over course. The wheel does not sway in operation, but tends to stabilize its course and follow a straight line.

The model 400 has been extensively field-tested and is being used in water works industry applications such as physical inventories, leakage surveys, street opening surveys, locating paving cuts, main extension measurements, map correction, and general estimating work. It measures around corners, over contours with equal facility and accuracy.

It weighs only five pounds and is easily and efficiently operated by one man. Counter is in plain view at all times. The handle folds compactly so wheel can be easily carried and stored in car or truck compartment. Handy stand holds wheel upright while operator is logging data, without losing count of distance. The model 400 also can be operated by the driver of a car as he drives slowly over course to be measured. The Rolatape is accurately calibrated and sturdily constructed.

MORE YARDAGE
LESS LABOR
LARGER PROFITS

Here is a Sauerman Slackline Cableway supplying a screening plant with 225 tons of gravel an hour. Pit is 900' long, 400' wide, 100' deep.

Why it pays to use

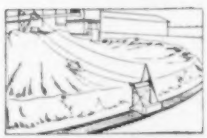
SAUERMAN MACHINES

Savings in equipment cost, time, labor and maintenance are four big reasons for using Sauerman Scraper and Cableway machines for all your long range material handling work.

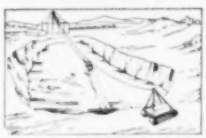
One-man control, fast action, simple and trouble-free. A Sauerman machine reaches across a river, deep down into a pit, up to the top of a hill or across a wide stockpile—moves material from any point within its cable radius, and dumps automatically wherever required.

Whether you handle a few tons a day, or many thousand tons, there is a size and type of Sauerman machine suited to your requirements—a machine that will give you years of steady service at minimum expense, no matter how tough the work it is called upon to do.

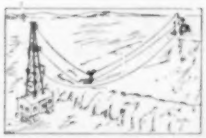
Sauerman Scraper Excavator



Sauerman Scraper Stockpiler



Sauerman Slackline Cableway



Sauerman Tower Excavator

These free catalogs offer valuable advice on handling materials at long range. Write for them now.

The different Sauerman machines are described in detail in a series of catalogs, liberally illustrated with drawings and photographs. Tell us about your material handling problems and we will send you the catalogs that will be of most interest to you.

SAUERMAN BROS., Inc.

574 S. CLINTON ST. CHICAGO 7, ILLINOIS

New trade literature

Title: **Equipment Catalog**
Subject: Condensed pocket size catalog shows all the products Athey builds. It also has a spread of photos showing how Athey equipment helped in World War II.
Where to Get: Athey Products Corp., Chicago 38, Ill. (Free)

Title: **Tunnel Mixers**
Subject: Bulletin describes in detail Worthington's 35s Dual Drum tunnel mixers and gives specifications, construction features and application suggestions.
Where to Get: Worthington Pump and Machinery Corp., Harrison, N. J. (Free)

Title: **Sanitary Landfill**
Subject: Description of community health problems and various methods of refuse and garbage disposal are treated pictorially and by the use of comic-type cartoons. A progressive history of a typical community, showing how it finally determines the proper method and equipment in solving proper garbage and refuse disposal is discussed in detail. The booklet, designed to serve as a guide to proper site selections, the choice of the right equipment to do the job, and the actual operation of the sanitary fill, points out to the reader the pertinent facts about the sanitary landfill method. It illustrates what other communities and cities have done and are doing to solve their own individual problems.
Where to Get: Caterpillar Tractor Co., Peoria 8, Ill. (Free)

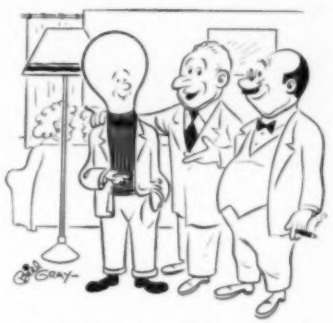
Title: **Fundamentals of Electro-Chemical Measurements**
Subject: Measurement of pH, redox, and conductivity in industrial control systems is comprehensively covered in a 24-page bulletin. Fundamental principles of electro-chemical measurements as well as final control elements for automatic control systems are included.
Where to Get: Minneapolis-Honeywell Regulator Co., Philadelphia 44, Pa. (Free)

Title: **Water Control Problems**
Subject: Folder tells how Armco gates meet water control needs. Easy operation, long service life, adaptability, and low cost are listed as several of their features which have resulted in the wide use of Armco gates in irrigation, flood control, drainage, sewage and water supply. Photographs show typical applications of some of the 27 different models of gates.
Where to Get: Armco Drainage & Metal Products, Inc., Middletown, Ohio. (Free)

Title: **Blocks and Sheaves**
Subject: Catalog describing the complete line of American blocks and sheaves. Information includes block number, capacity in tons, number of sheaves rope size and weight of each block. Also of interest to block and sheave users, a section on how to figure line parts, the illustrations, ratio table and formula included in this section will make reeving and line part figuring easy for riggers. This informative catalog is designed to make ordering a simple matter. Specifications are easy to understand and all related items grouped to avoid unnecessary hunting.
Where to Get: American Hoist & Derrick Co., St. Paul 1, Minn. (Free)

Title: **Central Mixing**
Subject: A 4-page pamphlet designed to show the economies and increased production that can be gained through pre-mixing and delivery of concrete in non-agitating equipment. Twelve different types of central mixing plants are illustrated and briefly described.
Where to Get: Maxon Construction Co., Inc., Dayton 2, Ohio. (Free)

Title: **22-Ton Rear-Dump**
Subject: Catalog folder covering models 31TD and 53TD rear-dump Euclids of 44,000-lb. payload capacity. Well illustrated, this catalog describes many of the important parts such as the planetary drive axle, transmission, frame, hoists, etc., and



"Homer is with the Electric Company."

ERIE BUCKET CATALOG *Shows*

Gross Loads for 43 Standard 2-Line Buckets in 9 Materials

Write for a copy of Catalog 2L-2. Compare your present bucket performance to see if you are getting the most from your crane. Or send us size and make of crane and materials handled, giving present bucket output. We'll give you Erie's proved bucket performance for your crane.

Erie makes 4 standard types of 2-line buckets in 43 sizes.

ERIE
STEEL CONSTRUCTION COMPANY
416 GEIST ROAD • ERIE, PENNSYLVANIA

Send for this booklet about two remarkable new wire ropes . . . .

Roebling's new 6 x 43 and 6 x 49 Wire Ropes break all records on excavating machines

IN THIS NEW BOOKLET you will find a complete list of Roebling wire rope recommendations for top efficiency in every type of excavator service. And two of these ropes, 6 x 43 and 6 x 49 Preformed "Blue Center" Steel with I.W.R.C., are recent Roebling developments of prime importance to all users of medium and large size shovels, draglines and dredges. Their special construction brings unusual abrasion resistance, increased flexibility, and exceptionally high resistance to internal fatigue—a combination that establishes a brand new standard of service life and economy.

These 6 x 43 and 6 x 49 "Blue Center" Steel Wire Ropes are further evidence of Roebling leadership in developing ropes that give improved performance and save money for users in particular types of service. Mail coupon today for your copy of "Roebling Wire Rope for Excavators." John A. Roebling's Sons Company, Trenton 2, New Jersey.

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Atlanta, 934 Avon Avenue ★ ***Boston,*** 51 Sleeper St. ★ ***Chicago,*** 5525 W. Roosevelt Rd. ★ ***Cincinnati,*** 3253 Fredonia Ave. ★ ***Cleveland,*** 701 St. Clair Ave., N.E. ★ ***Denver,*** 4801 Jackson St. ★ ***Detroit,*** 915 Fisher Building ★ ***Houston,*** 6216 Navigation Blvd. ★ ***Los Angeles,*** 216 S. Alameda St. ★ ***New York,*** 19 Rector St. ★ ***Odessa, Tex.,*** 1920 E. 2nd St. ★ ***Philadelphia,*** 230 Vine St. ★ ***San Francisco,*** 1740 17th St. ★ ***Seattle,*** 900 1st Ave., S. ★ ***Tulsa,*** 321 N. Cheyenne St. ★ Export Sales Office, ***Trenton, N. J.***

John A. Roebling's Sons Company
Trenton 2, New Jersey

Gentlemen: We are interested in cutting wire rope costs. Kindly send me free copy of "Roebling Wire Rope for Excavators".

Name..... Title.....

Company.....

Address.....

City..... Zone..... State.....

contains specification data on the complete units. These new Euclid models are improved designs of the same capacity "Eucs" that are widely used for off-the-highway hauling of earth, rock, ore and other materials in construction, mine and quarry work.
Where to Get: Euclid Road Machinery Co., Cleveland 17, Ohio. (Free)

Title: **ElectroniK Potentiometers**
Subject: Catalog covers ElectroniK electric control potentiometers for both contact and proportional control. Engineering and constructional data, types of control, partial list of available ranges, application data, and accessories are described.
Where to Get: Minneapolis-Honeywell Regulator Co., Philadelphia 44, Pa. (Free)

Title: **Diesel Tractor**
Subject: Mailer describes and illustrates Caterpillar DW20 tractor. Contains pictures and illustrations plus complete specifications. Opens into large cut-away view of tractor.
Where to Get: Caterpillar Tractor Co., Peoria, Ill. (Free)

Title: **Protective Maintenance Increases Profits**
Subject: Folder describes how to start and maintain a complete and adequate maintenance program for Cummins diesels. It includes a definition of protective maintenance, how to determine a maintenance schedule, five reasons for following the schedule and, on the back cover, a maintenance schedule. Although this guide does not fit every operation, it will, however, give the operator a program which can be changed as the experience of the owner indicates.
Where to Get: Cummins Engine Co., Inc., Columbus, Ind. (Free)

Title: **Shoveloader**
Subject: Bulletin on the Lull Shoveloader describes and illustrates models 4 A, B and C with specifications. The inside spread suggests 18 questions to be asked before buying any loader. Features are also listed.
Where to Get: Lull Mfg. Co., Minneapolis 6, Minn. (Free)

Title: **Maintenance and Care of Clamshell Buckets**
Subject: A bulletin containing 42 pages of practical and useful information on the maintenance and care of clamshell buckets. Included are suggestions on the proper use of clamshell buckets, with a list of common abuses to be avoided. Of particular interest to operating men is the section on bucket lips. What makes bucket lips bow in or bend out? There are descriptions for straightening distorted lips, together with detailed illustrated instructions on repairing fractures, hard surfacing cutting edges and rebuilding worn cutting edges.
Where to Get: Blaw-Knox Co., Pittsburgh 22, Pa. (Free)

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Your Income Possibilities

With a Double-Duty Drill

This Bucyrus-Erie 22-W drill, designed for water well work, is also ideal for small shallow blast hole drilling.

ADDED sources of profitable work can be yours with a double-duty Bucyrus-Erie 20-W or 22-W churn drill...machines that increase your potential job market by handling a wide range of work. They can be used for contract or by-the-day blast hole drilling in small quarries, and the same machines can handle profitable water well drilling jobs over a wide territory.

To decrease idle drill time and increase your income, include the Bucyrus-Erie 20-W and 22-W in your future plans for new equipment purchases. Write today for complete information! 125W51

BUCYRUS ERIE SOUTH MILWAUKEE WISCONSIN

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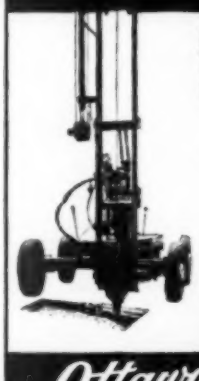

REPLACES:
3 men each using a $300 jack-hammer
$4700 compressor for jack-hammers
$2900 tow truck and driver, or
$3800 breaker and operator
$5400 compressor for breaker
$2300 tow truck and driver for breaker and compressor

Save time and money on labor and equipment with the revolutionary Ottawa Self-Propelled Hydra-Hammer. No skilled operators needed for this multi-purpose tool, any man able to drive a truck can learn to operate the Hydra-Hammer in an hour.

The Hydra-Hammer travels under its own power up to 12 MPH. Converts from travel to work position by elevating the tower and shifting gears. No extra engine or hose couplings to slow production. The 400-pound hammer falls free, eliminating shock and high maintenance costs.

Write today for descriptive booklet . . . see how you can reap profits from the amazing Self-Propelled Hydra-Hammer!

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INDUSTRIAL DIVISION
OTTAWA, KANSAS • U. S. A.

TO ADVERTISE: All advertising in this section is payable in advance. Rate: 60c per line, or $7.20 per inch of 12 lines. Minimum charge $2.40. No discounts; no commissions. Please count your copy carefully to avoid delay. Each line contains 41 characters (34 characters if all capital letters are used). Count spaces and punctuation as one character each. Allow 10 characters for box number, if blind advertisement is desired. Be sure to enclose the correct amount of money with your order. Closing date — 15th of preceding month. Example: January closes December 15th.

TO INQUIRE: Be sure to address your inquiry to the advertiser by using the correct box number. Mail your letter in care of Excavating Engineer, South Milwaukee, Wisconsin. Write each advertiser a separate letter. Do not write us for name and address of advertiser. This information will not be given out. We have no information about the equipment advertised other than that shown in the advertisements themselves.

FOR SALE

750-B BUCYRUS-ERIE 16 cu. yd. electric shovel, full Ward-Leonard.

9-W BUCYRUS-ERIE 7 cu. yd. dragline, 200 foot boom, full Ward-Leonard.

Both machines will become available in September, 1951. Good stock of spare parts. Located in Middlewest. Inquiry Box No. 3438, c/o EXCAVATING ENGINEER.

Northwest 80-D combination shovel-dragline; Link Belt K-580 shovel (new 1948); three Euclids Bottom Dump, one 15-yard, two 12-yard.

Geo. F. Smith Company Inc.
5215 Manchester Avenue
St. Louis 10, Missouri

Link Belt dragline — 2½ yard Model K595 — 85 ft. boom. Excellent condition. Box 3447

Bucyrus-Erie model 29-B shovel and backhoe combination complete with Caterpillar D-8800 engine. Good condition. Price $12,100. F.O.B. Kentucky.

Brandeis Machinery & Supply Co.
Brook & Warnock Sts. Louisville, Ky.

Model 10-B shovel, dragshovel, and dragline combination, Serial No. 15862, Hercules gasoline engine, located in Northern Minnesota. Box 3444

Lorain 820, 2-yd. dragline, swamp pads, light plant, 2-yd. Hendrix bucket.
3—Caterpillar DW-10 tractors w/W-10 wagons.

Eaglebarger & Goddard, Inc.
8212 Hardy Street
Houston, Texas

Northwest model 25; 6; 80D; 95. Manitowoc 6500; 4500 new — will rent. Bucyrus 54-B; Monighan 5W; 7W; 9W; 450.

A. W. Nevers Phone 32 Mt. Pleasant, Iowa

Used, one-yard Osgood combination shovel and dragline by contractor. Good condition. Location Kansas. Reply Excavating Engineer, Box 3440.

Electric Cable for Sale

1 reel — 1025 feet Coronol Geoprene mine power cable. 2-0 — AWG — 5000 V. — 3 conductor. NEW — never used.
1000 feet — portable cable — Amerclad — Type SHD No. 2 — 3 conductor — 133 strand — 5000 V. NEW.
1000 feet — portable cable — same as above — slightly used — has 6 splices — all in good condition.
7000 feet — shielded preassembled aerial cable — 5 KV — 2-0 — 3 conductor w/copper shielded tape — used but in good condition. Box 3446

Used Dragline Buckets

1—Page — 4½ cubic yard
1—Red Arch — 5 cubic yard
3—Red Arch — 6 cubic yard
1—Red Arch — 7 cubic yard
Need repairs — will sell as is. Box 3445

Koehring, 1947 Model 204, ¾-yard shovel, back hoe and crane — $15,500.
Two 38B Bucyrus-Erie shovels, diesel motors, 1948 models.
Link Belt Speeder back hoe attachment only, in perfect condition, used hardly at all — $1900.
TD14 tractor, 1946, hydraulic angledozer blade, in good condition — $9500.
Two Slusser McLean scrapers, 10 to 12½ yards — $2500 each.
D8 Caterpillar tractor, series 1H1180, with all new sprockets, pins, bushings and idlers, hydraulic, 2-drum power control unit, 1940 — $9300.
Northwest Model 6, 1949 shovel, Murphy diesel motor.
Searchlight trailer, tilt trailer, good for D2 Caterpillar or TD6, roller or compressor — $475.
Peerless 4-inch deep well pump with four cylinder Wisconsin motor, in crate, new — $499.
Allis-Chalmers pump, 2" x 1¾", one cylinder Wisconsin motor, in crate, new — $195.
Winch with 6-cylinder Hercules motor, new, in crate, motor will fit ¾-yard shovel — $600.
1 rear mounted crane, Hughes-Keenan, for a D7 which is equipped with a hoister winch — $850.
Manganese dipper fronts or lips for 1½-yard Lorain or 1¼-yard Northwest, also backs for 2-yard Northwest, 1¼-yard Link Belt — these are new.
Set of new chains and pads for D4.
Two-drum power control unit for TD14 and 18.
Two-drum, two-niggerhead cargo winches from ships, one new, one used, electric motors — $450 each.
One new two-drum power control unit for a D7 — $650.
Three sets of crowd chains for ¾-yard Koehring shovel.
One lighting plant for 2-yard shovel — $400.
The above equipment is our own. Immediately available, subject to prior sale. If there is any other equipment you need or want to get rid of, we will be glad to hear from you.

R. E. Cunniff
393 Brookline Street, Newton Center 59, Mass.
Lasell 7-4300

For Rent Or Sale

Model 1055 LC, P&H dragline SN 12962. New 1948. Completely overhauled. A-1 condition.

Usona Construction Company
314 North Broadway, Central 3314
St. Louis 2, Missouri

Six Esco heavy duty dragline buckets 1¾ cu. yds. complete with renewable manganese steel inserts for back and bottom. Five of these buckets are brand new, the other one has worked for only approx. 100 hours. Bucket spares, specifications as follows: two E-7049-B RH wearing shoes; two E-7050-B LH wearing shoes; four A-6086 lower hoist chains No. 4; four A-6086 No. 3 upper hoist chains; two E-8775 hitch plate extensions; sixteen E-3496 trunnion pins; four A-9218 No. 4 drag chains; sixteen E-8839 trunnion link pins; sixteen E-6964 spreader bar pins; eight 1¾" S.D. hitch shackles; eight E-7594 S.D. hitch shackle pins; eighty C-32-B keys; one A-8277 No. 1 dump sheave pin; two A-5766 No. 2 roller bearings; eight A-4436 No. 1 retainers; eight A-4437 No. 1 retainer locks; four E-8900 lower hitch pin heads; eight E-7351 hitch plate extension bushings; eight E-3848 dump rope socket wedges; sixty-six No. 5 pins; sixty-six rubber plugs; eight C-50-B S.D. hitch shackle pin keys; four S-4181 upper dump rope sockets; two E-9183 drag rope sockets; two S-8 drag rope socket wedges; two E-4696 drag rope socket pins; two A-6355 No. 2 drag rope socket pin locks; two E-5242 dump rope sockets; two E-3848 dump rope socket wedges; two E-5243 dump rope socket pins; two A-6355 No. 2 dump rope socket pin locks; two E-5241 triangle plates; two E-7159 hitch chain shackles; two E-8244 hitch chain shackle pins; two A-6355 No. 2 hitch chain shackle pin locks; twenty-four C-32-C, two teeth; twenty-eight C-33-ACR-5 adapters; seventy-four R-5 points; 250 WOR-5 Weld-on points.
One 60' P&H No. 885 model dragline boom, brand new.
Clamshell equipment for dragline machine, including two new drums, new A-frame head, one additional sheave for boom point, new top boom section. Closing and holding ropes and tagline equipment.
Clamshell equipment for dragline lifting crane machine. Boom point sheave and guard, tagline equipment ropes for 45'0" boom. Box 3436

One new 4 cu. ft. Hayward multi-power orange peel bucket. Box 3443

Used 10-B shovel attachment for sale or trade for 10-B dragshovel attachment. Box 3441

New shovel front for Bucyrus-Erie 22-B. Available for immediate sale.

The Bode Finn Company
2650 Spring Grove Avenue
Cincinnati 14, Ohio

New Dragline Buckets

2½ cubic yard Type AX dragline bucket. (Reconditioned.)

3 cubic yard Red Arch, Type AY heavy duty bucket.

Bucyrus-Erie Company
Parts Division
South Milwaukee, Wisconsin

Continued on page 64

For Sale

Continued from page 63

50% Discount

Genuine Hendrix Unused Dragline Parts for Bucket Sizes

3/8 yd. to 2 1/2 yd.

LIPS — CHAINS — PINS, ETC.

Write for Complete List

Quick Service Company
1226 West Adams Street
Chicago, Illinois

12-yard dragline bucket, medium weight, excellent condition, made by Esco. Price $2400 f.o.b. Yuma, Arizona, subject to inspection.

Grafe-Callahan Construction Company
1602 First National Bank Building, Dallas, Tex.

Available for shipment from Atlanta, complete new shovel front equipment for 10-B Bucyrus-Erie machine.

R. S. Armstrong & Bro. Co.
676 Marietta St., N. W. Atlanta, Georgia

Shovels, draglines, cranes, B-E 200B, 120B, 80B, 54B, 48B, 50B, 37B, GA-3, 6W, 5W; Hydro truck crane, 2-ton; Page 621-S.
Euclid 15-ton and 22-ton rear dump trucks.
Locomotives, 7 to 35-ton, gas, diesel, stm.
Diesel elec. generator sets, 100 to 875 KW.
Crushers, gyratory and jaw, large (5).
Dumptors-pans-diesel scrapers, 12 to 18 yd.
Trench excavators, Buckeye, Parsons (6).
Batch bins, 51-ton, 225 bbl., 2 truckmixers.
Bottom dump cars, 36" ga., 15 — 25 tons (66).
Rotary dryers, 54" x 40', 7' x 50', 10' x 90'.
Whirley gantry & locomotive cranes (5).
B-Erie shovel front att., 2 1/4 yd., 52B-55B.

H. Y. Smith Co.
828 N. Broadway, Milwaukee 2, Wis.

HELP WANTED

Dredgemasters & Winchmen

Experienced Dredgemasters and Winchmen for gold dredges operating in South America. Transportation, single status, to property and return to U. S. on completion two years work. Room, board and medical care provided free. Salary commensurate with experience and ability. Excellent opportunity for steady work. Write Mr. Albert McKee, 61 Broadway, Room 1720, New York 6, N. Y., and give full details previous training and experience.

Notes from the manufacturers

Huber Manufacturing Co., Marion, Ohio, has named Western Machinery & Engine Co., St. Louis, Mo., as distributor for the complete line of road building and maintenance equipment in eastern Missouri and central and southern Illinois. Key personnel of the firm include Hugh Scott, Sr., president; Gilbert A. Weidlich, vice-president; Gilbert J. Nichols, secretary and general manager; John H. Heintz, manager of the construction equipment division; Melvin Lusader, manager of the Centralia Branch; and Robert Gamel, service manager.

Hyster Co., Portland, Ore., has promoted Richard E. Stiegele to the position of sales manager, eastern tractor equipment sales division. Mr. Stiegele, who has been handling special assignments for the general sales department at Portland, will have headquarters at Peoria, Ill., where Hyster's eastern division industrial truck sales offices also are located. Mr. Stiegele graduated at Bradley University, joined the Caterpillar Tractor Co. in Peoria, and for 10 years was in the parts, service and sales departments. Mr. Stiegele joined Hyster Company in 1946, and for two years was a district representative for Hyster in southeastern states. Two years ago he was transferred to Portland.

D-A Lubricant Co., Inc., Indianapolis, Ind., announced the appointment of Jones Miller Robinson, Amarillo, as North Texas sales representative. He has had previous experience with lubricants as well as heavy-duty machinery. He attended John Tarleton Agricultural College, and Texas Agricultural and Mechanical College. Mr. Robinson has recently completed an intensive training program with the company.

Joy Manufacturing Co., Pittsburgh, Pa., has appointed Interstate Equipment Co., Statesville, N. C., as exclusive distributor of construction equipment for North Carolina. Coincidentally, Interstate has recently moved into new and larger quarters in Statesville and now offers modern, convenient facilities for the servicing and warehousing of construction equipment. This latest appointment authorizes the sale of their complete line of portable air compressors, wagon drills, paving breakers, spaders, tampers, rock drills, and hoists.

Nordberg Manufacturing Co., Milwaukee, Wis., has appointed E. M. Wakeman & Associates, Lakeland, Fla., as industrial distributor in the state of Florida and the gulf counties of Mobile and Baldwin, Ala. Established early in 1947, E. M. Wakeman & Associates maintain complete coverage of their territory with salesmen located in leading industrial and trading areas of Jacksonville, Orlando, West Palm Beach, Miami, Tampa and Pensacola, Fla. Mr. Wakeman, owner of the company, and Mr. Scott Linder, sales manager, work out of the centrally located home office in Lakeland. A company plane gives both officials close contact with customers, prospects and company salesmen.

Caterpillar Tractor Co., Peoria, Ill., has named R. C. Haungs as district representative contacting distributors in New York, Vermont, New Hampshire and Connecticut. A native Peorian, Haungs attended Brown's Business College and the American Institute of Banking, joining Caterpillar in 1940. In 1946 Haungs joined Carolina Tractor & Equipment Co., Salisbury, N. C., as an accountant. He remained in that position until his recent appointment as district representative.

Colorado Fuel and Iron Corp. Executive Offices and the New York Sales Offices of the Wickwire Spencer Steel Division have re-located at 575 Madison Ave., New York 22, N. Y., Tel. Murray Hill 8-5400.

Cummins Engine Co., Columbus, Ind., has announced the merger of two wholly owned Cummins sales and service organizations with Cummins Diesel Sales Corp. and the appointment of a general manager. William B. Lawrence, formerly regional manager for the Rocky Mountain region with headquarters in Denver, Colo., has been named general manager of the sales corporation, which has headquarters at Columbus. Subsidiaries affected by the merger are Cummins Diesel Sales Corp. of Illinois at Chicago; and Cummins Diesel Sales and Service of New York at NYC. These two organizations are now identified with Cummins Diesel Sales Corp., which includes dealerships at St. Paul, Omaha, Indianapolis, and Memphis. Also announced by the company is the appointment of Charles C. Sons, as acting eastern service manager, with headquarters in Columbus. Dillard B. Davis, formerly eastern service manager, now is regional service representative in the central region with headquarters in Chicago. Davis replaces Lloyd Kerber who recently resigned to accept the position of general service manager for Cummins Diesel Sales Corp., St. Louis.

Tournadozer on TIMKEN® bearings moves 94.5 yards an hour on 321-foot push

WHEN 105,000 tons of gravel were needed for highway construction near Orem, Utah, the big problem was moving gravel from pit to mix plant fast enough for steady output. The problem was solved when a Timken® bearing equipped Super C Tournadozer was put on the job. It moved 94.5 yards of gravel an hour on a 321-foot, 1-way push from pit to plant!

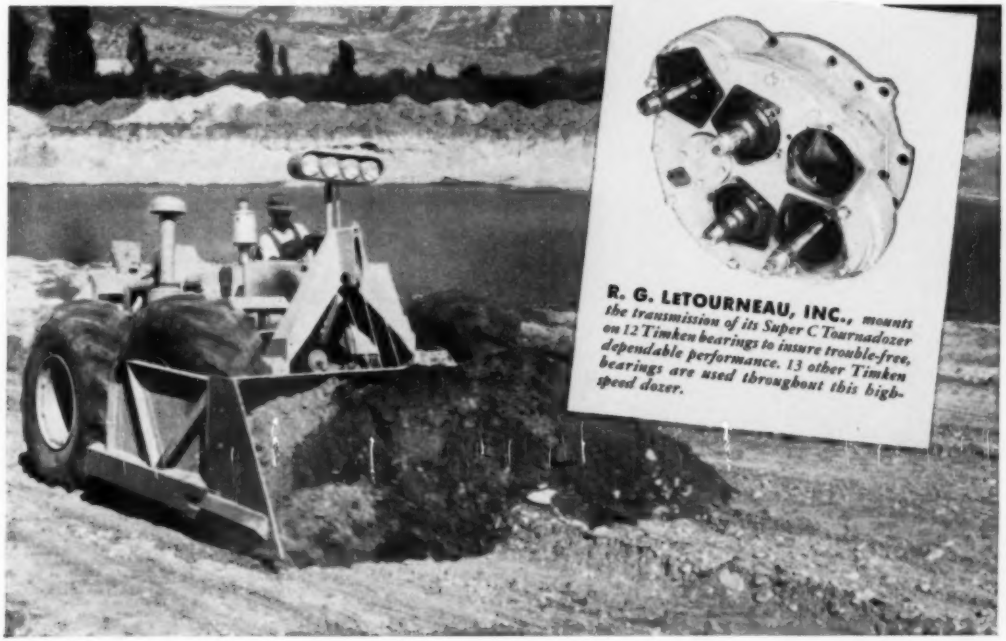
Built by R. G. LeTourneau, Inc., the high-speed Tournadozer uses 25 Timken tapered roller bearings to insure fast operation, long life and trouble-free performance. Timken bearings in the transmission keep gears and shafts in alignment, reduce wear, assure a smooth flow of power. And because they're mounted on Timken bearings, the dozer blade control and scraper attachment gear boxes take the heavy loads easily. Maintenance and lubrication are reduced.

Tapered construction enables Timken bearings to take any combination of radial and thrust loads. Line contact between rollers and races gives extra load-carrying capacity. True rolling motion plus an incredibly smooth surface finish makes friction negligible. And tight, lubricant-retaining closures keep out damaging dirt and moisture, keep the lubricant in.

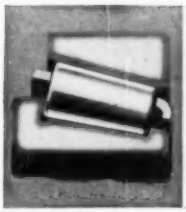
Timken bearings are made of the finest steel ever developed for tapered roller bearings—Timken fine alloy steel, are engineered for the job and precision manufactured—three reasons why Timken bearings normally last the life of the machine.

No other bearing can give you *all* the advantages you get with Timken bearings. That's why bearings with the trade-mark "Timken" are industry's No. 1 choice. Insist on them when you buy. Specify them when you build. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.



R. G. LETOURNEAU, INC., *mounts the transmission of its Super C Tournadozer on 12 Timken bearings to insure trouble-free, dependable performance. 13 other Timken bearings are used throughout this high-speed dozer.*



GREATER LOAD AREA

Because the load is carried on the *line* of contact between rollers and races, Timken bearings carry greater loads, hold shafts in line, wear longer. The Timken Roller Bearing Company is the acknowledged leader in: 1. advanced design; 2. precision manufacturing; 3. rigid quality control; 4. special analysis steels.

TIMKEN

TRADE MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS

NOT JUST A BALL ○ NOT JUST A ROLLER ▭ THE TIMKEN TAPERED ROLLER ▭ BEARING TAKES RADIAL ▯ AND THRUST →▯← LOADS OR ANY COMBINATION →◎←

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WIRE ROPE

Available through Distributors
All Around America

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Reduces Accidents—Lasts Longer

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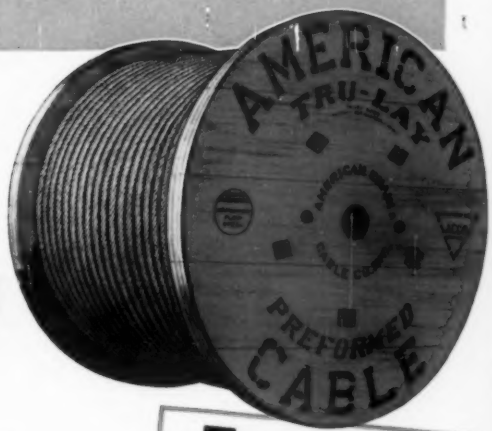

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Wilkes-Barre, Pa., Chicago, Denver, Houston, Los Angeles,
New York, Odessa, Tex., Philadelphia, Pittsburgh, San Francisco, Bridgeport, Conn.

AMERICAN CHAIN & CABLE
AMERICAN CABLE DIVISION

Tru-Lay *Preformed* **Wire Rope**

TRADE MARK

In Business for Your Safety